DOCUMENT RESUME

ED 433 654 EC 307 399

AUTHOR	Hutinger, Patricia L.; Johanson, Joyce; Robinson, Linda; Schneider, Carol
TITLE	Building InterACTTive Futures.
INSTITUTION	Western Illinois Univ., Macomb.
SPONS AGENCY	Special Education Programs (ED/OSERS), Washington, DC. Early Education Program for Children with Disabilities.
PUB DATE	1998-00-00
NOTE	169p.; ACTT = "Activating Children Through Technology."
CONTRACT	H024D20044
AVAILABLE FROM	Macomb Projects 1998, 27 Horrabin Hall, 1 University Circle, Western Illinois University, Macomb, IL 61455; Tel: 309-298-1634; Web site: http://www.mprojects.wiu.edu
PUB TYPE	Guides - Classroom - Teacher (052)
EDRS PRICE	MF01/PC07 Plus Postage.
DESCRIPTORS	Assistive Devices (for Disabled); Computer Software; *Computer Uses in Education; *Curriculum Development; *Disabilities; *Early Intervention; *Educational Environment; Family Involvement; Input Output Devices; *Learning Activities; Preschool Education; Resource Materials; Severe Disabilities

ABSTRACT

This curriculum guide presents a comprehensive approach to using technology with children. Chapter 1 presents the curriculum's philosophy and identifies benefits and applications of technology for young children. Chapter 2 looks at the learning environment (including preschool environments, birth to three environments, and environments for children with severe disabilities) and offers guidelines for purchasing and using computer equipment. Chapter 3 is on family participation and offers suggestions for children ages birth to 3, 3 to 5, and with severe disabilities, as well as suggestions for conducting a family computer workshop. Chapter 4 is on technology assessment, while chapter 5 focuses on switches and switch adaptations. A potpourri of curriculum activities is described in chapter 6, organized around specific software packages. Procedures for customizing activities are contained in chapter 7, including adaptations for children with motor, visual, or auditory impairment. The appendix contains resource information on software, adaptive equipment, off-computer materials, technology-related organizations, and World Wide Web sites. (Contains an index.) (DB)

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BUILDING INTERACTTIVE FUTURES

Patricia Hutinger,
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and Carol Schneider

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Building InterACTTive Futures

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Acknowledgments

The authors gratefully acknowledge the contributions of the following people: Macomb Projects' staff members Marisa Beard, Carol Bell, Amy Betz, Letha Clark, Nancy Heuer, Judy Potter, and Clare Terry who read, edited, typed, suggested ideas, and offered encouragement as *Building InterACTTive Futures* was developed.

Early childhood teachers, support staff, and families from 47 Activating Children Through Technology (ACTT) replication sites who have used technology with young children over the past 10 years. They have been the source of many of the curriculum ideas written here. Their children have been the inspiration.

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This work was developed by ACTT Outreach: Activating Children Through Technology, PR#H024D20044, funded by the United States Department of Education, Office of Special Education and Rehabilitative Services, Office of Special Education Programs, Early Education Program for Children with Disabilities. The content, however, does not necessarily reflect the position of the United States Department of Education, and no official endorsement of these materials should be inferred. References to commercial products, trade names, or manufacturers do not constitute endorsement by the United States Department of Education.

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Chapter One

Curriculum Philosophy and Format

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Why We Use Computers

Technology provides the means by which all children can interact within their environment. Adaptive equipment and activities can assist young children with disabilities in establishing independent behavior and functioning to their full potential. *Building InterACTTive Futures* is based on the belief that computers and related adaptations provide children with tools to encourage autonomous behavior in ways that cannot be matched by other materials and experiences.

Assistive technology provides families and early childhood staff ways to encourage children themselves to act, in effect to 'head learned helplessness off at the pass' as children grow older. The positive impact of technology on the lives of individuals with disabilities and their families and communities was recognized in the passage and reauthorization of the Technology Related Assistance to Individuals with Disabilities Act, P.L. 103-218, and the Individuals with Disabilities Education Act, IDEA. The 1997 Amendments to IDEA, P.L. 105-17, states specifically that the IEP team shall "consider whether the child requires assistive devices and services" (NICHCY, 1997).

Using computers in educational activities relevant to needs and interests, children gain self-confidence, social skills, communication skills, gross and fine motor skills, problem solving skills, and a wide range of abilities and knowledge needed to function in society. Computers do not replace manipulative, tactile experiences children need, but provide another way for them to interact with people, objects and the environment.

Disabled or not, most young children are active learners, constructing knowledge through experiences within their environment. Play is the vehicle children use to make sense out of their world. Learning should be full of delight, not drudgery. Activities presented to young children must be closely related to their interests and experiences. Interest and curiosity act as catalysts for the young child's learning. The computer is another kind of learning material, another center, a tool of multiple uses and multiple learning experiences.

Children

Although computers can be used for play, the computers children use are not toys. They are the 'real thing,' the same equipment that their parents use at work or at home, the same equipment their teacher uses to write newsletters and maintain records. Unlike adults who may be apprehensive about technology, children accept it readily. Technology is no more new to them than the myriad of other new experiences and stimuli that come their way regularly. Children can learn to operate a software program as easily as they learn to turn on the TV or operate the VCR.

Computers are especially successful adaptive devices for children with physical disabilities who cannot access their environment. Children who will never be able to hold a pencil can use graphics programs for drawing and word processing for writing. Children who are unable to speak can use a computer as a communication tool. For those who speak, a computer provides topics and incentive for conversations. Social interaction among children using a computer occurs spontaneously and should be encouraged.

Children need to be active participants in their own learning, have the abilities to make responses, and respond if activities are under their control. They should be able to choose the activities that they wish to pursue and determine the amount of time they wish to spend on that activity. Children also need to act on objects themselves (i.e., construct their own reality or view of the world and the objects in it). Children need to maintain control of their own environment and their own behavior. Computer applications address these conditions.

Young children learn when events contain some novelty or an element of newness elicits surprise. They also need plenty of opportunities to repeat both computer and computer-related activities that they find interesting. Beginning computer use with very young children usually involves establishing the concept of cause and effect then moves on to new goals and activities as children find they can have an impact on their environment.

Families

Families should be involved, to the extent they desire, in computer intervention. Participation can range from awareness of aspects of technology intervention, to assisting with technology activities, to carrying out similar activities. Gaining skills necessary for using computers with children can be built into individual family service plans. Through the use of technology, families may see their children for the first time as active participants in society, able to interact with their environment. Technology may be the key families need to open the doors of opportunity for their children (Robinson, 1997).

Technology

Contemporary technology applications give young children with disabilities a set of tools to access people, objects, and events in their environment in ways that were not possible fifteen years ago. Although computers are a part of everyday life in this information age, children can use them for communication, play, social interaction, problem solving, and other learning. Research results from a qualitative study of children with moderate to severe disabilities who had used technology for an average of 6.4 years, show positive benefits related to social and emotional outcomes as well as improvements across developmental domains of cognition and communication (Hutinger, Johanson, Stoneburner, 1996). Studies conducted by Project ACTT demonstrate significant gains in problem solving by preschool children who had used Logo during a one year period. Gains in emergent literacy have been evidenced by children in preschool classrooms which have used the *eMERGing Literacy and Technology: Working Together* curriculum, an interactive technology literacy curriculum. Interactive software, computer activities, adaptations, and off-computer materials were combined to encourage early reading and writing skills in young children (Hutinger, Beard, Bell, Bond, Johanson, Robinson, Schneider, & Terry, 1997).

Computers have endless patience and the potential to be "self-correcting," varying one attribute at a time, characteristics which make the materials extremely effective for young children's learning. Their increasing "user friendliness," sophisticated capabilities, lower cost, and well-publicized educational attributes attract families and educators alike. Further, because computer applications are becoming increasingly software driven, those with disabilities need fewer peripherals to use them. Many effective applications use off-the-shelf hardware, although some customization may still be needed.

As software companies realize the need for good software programs for children, such programs appear more frequently in the marketplace. Often the advertised use is not appropriate for young children or for a particular child's disabling condition, but a creative teacher can invent ways that children can use the software to meet individual educational objectives. Computer activities are integrated into the preschool curriculum in the same ways the standard materials are used.

Most software is now available on CD-ROM (Compact Disc-Read Only Memory). Since one disc can hold up to 656 megabytes of information, this type of software can have seemingly endless options with interactive features. The Living Books series are examples of interactive CD-ROMs for young children which provide exploratory formats for interacting with objects and people in stories. Software with authoring format, such as *HyperStudio* (Wagner, 1996) allows adults or children to create their own software to meet specific needs. Children can provide drawings and voice for the software.

Technology offers many options for targeting children's needs, beginning with control over their environment using switches, toys, and computer software, and progressing to more complex goals as children interact with software and help create their own screens on the computer. Software which allows the addition of children's own voices encourages increased communication, while other software enhances social skills by sparking discussion or requiring cooperation and turn-taking.

Team Approach

A team approach is essential to planning and implementing technology applications that really work for young children with disabilities. Depending on the nature of the child's disability, family members and a wide range of professionals need to work together to plan individualized computer activities and adaptations. Both technology assessment and actual implementation of technology experiences for children with severe disabilities may require input from occupational therapists, physical therapists, physicians, vision specialists, speech and language professionals, psychologists, child development personnel, and technology application experts. Input from family members, including parents and grandparents, is critical if the program is to be successful.

Teachers of children who use computers must be computer users themselves. If family members are also computer users, ties to positive perceptions of technology applications as useful activities are strengthened. When children see their teachers and parents using the computer, they know that the adults around them value technology. Print awareness, an important aspect of the early childhood environment, is extended when banners, posters, newsletters, and lists are generated by computer-using adults.

Teaching Strategies

The adult's role is critical in arranging the environment and planning developmentally appropriate activities integrated with the early childhood curriculum. Adults prepare the computer environment, making sure that materials are accessible, that activities are developmentally appropriate and interesting to children, and that, whether used in small groups or as a choice activity by a child or two, effective computer activities are readily available to children throughout the day.

Adults encourage children to explore, but they also model and provide appropriate cues when necessary, depending on individual child needs. Adults serve as facilitators for learning. They ask open-ended questions that help children think about what they are doing.

Teaching strategies are important to the success of any early childhood program. Refer to Chapter 2, "The Learning Environment," for more information on setting up the learning environment and implementing teaching strategies.

Above all, children should be provided with opportunities to develop to their highest potential. *Building InterACTTive Futures* is designed for families and early childhood staff to assist children in reaching that goal.

Benefits and Applications of Technology for Young Children

Although the use of computers in early intervention programs seems to be a fairly recent development, early childhood specialists have been using technology and conducting research on their effect on young children for more than fifteen years. Switches and toys were used in contingency intervention research conducted in the early 1980's by Richard Brinker and Michael Lewis (1982). Infants with severe disabilities learn that they can have an effect on their environment when they kick a leg or move an arm to make a toy move or music begin to play. Through the computer, variables of the intervention session, such as reinforcer and required response, are controlled and recorded (Brinker and Lewis, 1982; Johanson, 1990). Lewis found similar results with research conducted at Rutgers in New Jersey (Sullivan & Lewis, 1990).

Behrmann and Lahm established a design for technology applications research. Robots, communications, and environmental control were provided to young children with developmental delays through a systematic training approach (Behrmann and Lahm, 1984). A constant format for making choices was presented to the child, while the technology was "programmed" to adapt to different environments.

ACTT (Activating Children Through Technology) has developed technology applications for children and families since 1983 (Hutinger, 1984). We know through our experience that a computer can be a tool for all children, regardless of the severity of their disability. Teachers, therapists, and parents need to know the many benefits technology offers, and how to design activities for school or home.

With the growth of technology came an increasing number of applications for young children, even those who are less that three years of age. Technology represents a tool infants and toddlers, as well as preschoolers, can use to acquire developmental goals. Benefits also include developing a sense of control over the environment, developing a sense of independence, preparing for future computer use, and participating equally with others. Technology benefits families and staff also. Parents tend to become more involved in their child's program when computers are introduced. An adaptive device used by a son or daughter may help parents realize that their child can be an active participant in their environment. Technology is also a tool staff can use to produce newsletters, write program plans, and document child progress.

Developing Control and Independence

Young children thrive on opportunities to interact with their environment, as they begin to develop a sense of independence based on these experiences. Technology is the tool that children can use to develop independence, play equally with others, and accomplish early skills (Butler, 1988; Hutinger, 1994; Parette, Dunn & Hoge, 1995; Robinson, 1986a and 1986b).

Through the use of a switch and battery-operated toy or object, Lisa, a three-year-old with cerebral palsy, is able to control a part of her environment and play independently. As she plays, she is not only developing cognitive skills, but learning in many areas. The switch is her tool to help enhance her physical abilities. By moving her head slightly with a mercury switch on a headband, or reaching her hand to press a tread switch, she is able to activate a visual, auditory or tactile effect. The reinforcement Lisa receives may be from the movement and sound of a toy, the music or voices from a tape recorder,or the vibration from a pillow. By matching the switch and stimulus to Lisa's abilities and interests, an opportunity to play and gain a sense of control is given to the child. If a child such as Lisa has a disability, then she may need help from an adult, or from adaptations to her play environment to achieve the same sense of self-esteem and competence.

Besides toys, a computer with a color monitor, switch, and switch-operated software can be the means for developing a sense of control and early cognitive skills. A parent-infant educator who has been using technology for several years sums up the role computers play for young children in this way, "Some children who are very physically involved have a difficult time exploring their environment, and developing the cause and effect relationships that children who are mobile are able to develop. Control over their environment is difficult for them to achieve. Using computers allows them to learn cause and effect relationships and also to learn that they can have an impact on their environment."

Preparing for Future Computer Use

Early computer use introduces children to technology as tools they need for communication or environmental control throughout their lives, and will help prepare for sophisticated applications later. Using a simple switch and adapted toy helps children grow accustomed to using the switch as a tool which can some day be used with a computer and communication programs. Begin with a program in which a picture or sound changes with a switch press, and later progress to programs which require a press of the switch at an appropriate time to get the desired result. The child will learn that the switch has a function and that it can be the means for communicating needs.

Using Technology to Equalize Play

As a young child with physical disabilities begins to learn social skills in group activities, it is important that she knows she is an equal participant. Technology can help equalize play through switches and toys or software (Lane & Mistrett, 1996; Wright & Samaras, 1986). One switch can be passed among all members of the group to give each child a turn in activating a toy or music from a tape recorder. On the computer, each child can press the switch to add to the progression of action in a scene or to make a group picture. The child with a disability has the same opportunity to take a turn and be an equal member of the group. The feeling of equality is essential to the development of self-esteem and helps in furthering all skill areas. As one child development specialist stated, "For the more physically involved children who cannot manipulate toys, it's one way for them to be able to do the same things that the other children are doing."

Achieving Developmental Goals

Technology can be used as a tool for many areas of development, including cognition, fine motor, language and social skills. In the cognitive domain, adapted toys and a computer can help the child achieve, not only a sense of control over her environment, but increase attention span, stimulate gestures and verbal imitation, increase the concept of causal relationships, and lead to problem solving skills. The required press of an adaptive switch, a touch tablet, or keys on the keyboard, increases fine motor skills. Although children with physical disabilities will usually approach the keyboard with whole hand manipulation and banging, they learn that individual finger presses will achieve the desired results on the computer.

The effect of technology on language development has received national publicity over the years. Research has shown that the use of synthesized speech in computer activities does serve as a stimulus for language development (Buckleitner, 1994; Davidson & Wright, 1994; Meyers, 1984, 1990). Even children as young as eighteen months will begin to vocalize during activities which incorporate the computer, appropriate software, real toys, and the adult. As one early childhood program director explained, "We use the computer to have the children identify body parts, name pictures, match objects and pictures since it helps increase vocalizations. They tend to want to imitate the sounds. Even children who are not saying words will vocalize more and make more sounds when they are working with the computer."

In the area of social skills, the computer offers a reason to interact. Although very young children are not developmentally ready to participate in turn-taking activities, the computer and a touch tablet, such as the IntelliKeys, or Key Largo, can be used to encourage interaction. The graphics, animation and sound in selected software serve as a stimulus for the children to take turns pressing a picture on the device to get a picture on the monitor, and, perhaps a segment of a song. Computer reinforcement is exciting. Children attend to what the other children select and wait for their next turn. Various skills can be enhanced through use of technology depending on how the equipment is set up and what applications are designed to fit into the existing curriculum. Technology offers children and families in early childhood programs an opportunity to enhance development in alternative ways. The child's use of technology is just another part of a whole realm of experiences to enjoy. It is a part which holds many benefits for development and can be applied in many ways to the curriculum. By taking into consideration the child's goals, software and hardware adaptations, placement and positioning, computer-related planning and evaluation strategies, families and early childhood professionals will be able to take advantage of the technology's benefits in the most effective way.

Integrating Applications

Curriculum for young children covers a broad range of developmental activities, services, and strategies. Activities can be integrated across all domains (Hutinger, 1994). Technology can be applied to daily activities or the curriculum in many ways. Several components make up the design of computer applications. First, individual goals must be considered. All design factors will center around this goal. Next appropriate software and peripherals must be selected. Consideration must be made of how the equipment will be set-up and what adaptations may be needed to meet the child's goal. Other components which are essential to the design of the activity are off-computer activities and strategies to evaluate the activity. Careful consideration of all of these factors will result in the optimum design for curriculum applications.

Achieving Children's Goals

When developing computer activities, first consider the child and the goals his/her computer use will support and enhance. Since a computer can be used as a tool for achieving many developmental goals, children who demonstrate mild language delays can benefit from using a computer as much as those children who have severe physical impairments which prevent them from interacting with their environment. Each child uses computers in different ways, and for different purposes, but all may benefit.

Selecting Software and Peripherals

After determining the child's goals in conjunction with family members, the next consideration in the activity design is the software. A wide variety of software can be used for various skill areas. A list of suggested software for young children is included in the Appendix. Decisions on appropriate software will depend on the interests of the child and what type of input she will use with the computer. If cognitive skills, such as developing causality, are targeted and the child has severe physical limitations and needs an auditory as well as visual response, then a switch-operated program, such as *Switch Intro* (Johnston, 1993) for the Macintosh, which has a picture and song or sounds, may be desirable. Selection of software is narrowed to only those programs which operate with a switch and which contain auditory and visual reinforcement.

No matter how sophisticated the technology is, the activities must be developmentally appropriate for young children (Bredekamp, 1987). The child goal for the activity is an important, factor together with off-computer materials to reinforce the computer activity. For example, in a birth to three program an activity can be designed around sounds that children hear in the environment. The "Make it Sound" portion of the program, *Switch Intro,* is particularly appropriate for this activity. One picture at a time is presented to the child as he presses the switch to repeat a sound. The child controls the sound as he talks about it or imitates the sound with concrete objects, such as a play hammer, guitar or phone.

With the "Willy the Worm" portion of the same program, an activity can be designed to reinforce simple cognitive skills. A stuffed figure in the shape of a worm helps children explore the movements of the worm in and out of the play tunnel. "How can you make the worm move through the path to the tunnel?" "How can you make him come back after he disappears inside the tunnel?" Children play with the worm on the floor or on a table, then move the computer version of Willy the worm on the screen with a switch press.

A preschool child could use a switch with the "Tooney Loon" portion of *Thinkin' Things* (Edmark, 1995) software to create his own music with a switch press. Instead of concentrating on ready-made sounds, he can use a scanning array and choose what sounds he would like to make. Since a xylophone is shown on the screen, an off-computer activity may involve the use of a play xylophone to make music.

One of the preschool children's favorite programs, *Millie's Math House* (Edmark, 1992), can be used easily with off-computer materials. One part of the program appropriate for preschoolers is "Build-A-Bug" in which they can create their own crazy-looking bug both on and off the computer as a group or individual activity. By using special fabric for the bug figure, small felt objects, plastic eyes, pipe cleaner tails and various size pompoms can be attached to the bug body with Velcro backing.

"Big-Middle-Little," another part of the same program, is a fun way for young children to learn about sizes as well as many other early concepts. Children move the shoes on and off of three characters, daddy, mom and baby, until they find suitable shoes for each one. The voices and animation in the program capture the children's attention. Off-computer activities can be designed using the same felt board idea with different size characters and shoes available for the children to explore. Real shoes of varying sizes in the dress-up corner can be used in a game related to sizes.

Through the use of *Discover:Kenx* (Johnston, 1997) any program, such as *Millie's Math House*, can be adapted for use by a child who needs switch or touch tablet input. Switch activities can be designed to reinforce some of the beginning switch skills for children who have severe physical disabilities and will eventually be using a scanning mode for communication.

Through the use of a drawing program, *Kid Pix* (Brøderbund, 1991), children in both birth to three and preschool programs have and acquire cognitive skills as they explore the brush movements, paint patterns, stamps, and even sounds. Their creation can then be printed on a color printer. When more than one child uses the program, social skills and communication may also be enhanced.

Using the Computer as a Storyteller

One activity children of all ages enjoy is having a book read to them. With the programs, such as the Living Books series or *Storytime Tales* (Johnston, 1992), or the computer is used as the storyteller. Children can take turns turning the pages or exploring with a switch press or a touch on the TouchWindow. When off-computer materials such as a doll with dirty clothes, a play washing machine, or beach accessories are added, the children become active participants in the story.

Figures printed from the program can be felt and explored by a child who is visually impaired as the story is being read on the computer. The sound effects and the tactile figures make the story more concrete for him. The adult and child can both wear an apron made of material to which figures can be easily attached with Velcro. Chapter 8 contains an apron design.

With *Discover:Kenx* and Key Largo, or the IntelliKeys, a communication activity can be designed around any software program. An overlay can be created to provide a means for children to talk about Bobby, Molly and Forgetful after using *Storytime Tales*. It can be used as an individual or group activity.

How to Use the Curriculum

Building InterACTTive Futures begins with information on selecting equipment and software, designing the learning environment, establishing family involvement procedures, and assessing childen's individual technology needs. A potpourri of curriculum activities are contained in Chapter 6, organized alphabetically according to the name of the activity. Activities are designed around one piece of software, although other software with similar themes or content may be used. The activities list materials needed, procedures to be accomplished ahead of time in preparation for using a particular software program, suggestions for computer activities, ideas for related activities, and other activities for using the same program or a similar program, various curriculum integration ideas, and a brief summary. Each activity is written for a learning cycle level and may include suggestions for gearing up, down, or using the software for a group activity. The activities can be used across a number of categories including art, storytime, environment, community, food, and family.

Procedures for customizing activities for use with switch, Key Largo, or IntelliKeys are contained in Chapter 7. Adaptations for children with motor, visual, or auditory impairment are also included. Chapter 8 contains resource information on software, adaptive equipment, off-computer materials, and technology-related organizations and Web sites. Since the integration of technology into classroom activities involves designing off-computer materials, procedures for making some of those materials, such as a computer cover and a communication apron, can be found in the Appendix along with specific forms or other information referred to throughout the curriculum. The index provides assistance in locating software titles, devices, themes, or other topics of interest. *Building InterACTTive Futures* is designed to be a user friendly guide for any early childhood staff or family member to assist young children in using technology as an integrated part of their school and home activities.

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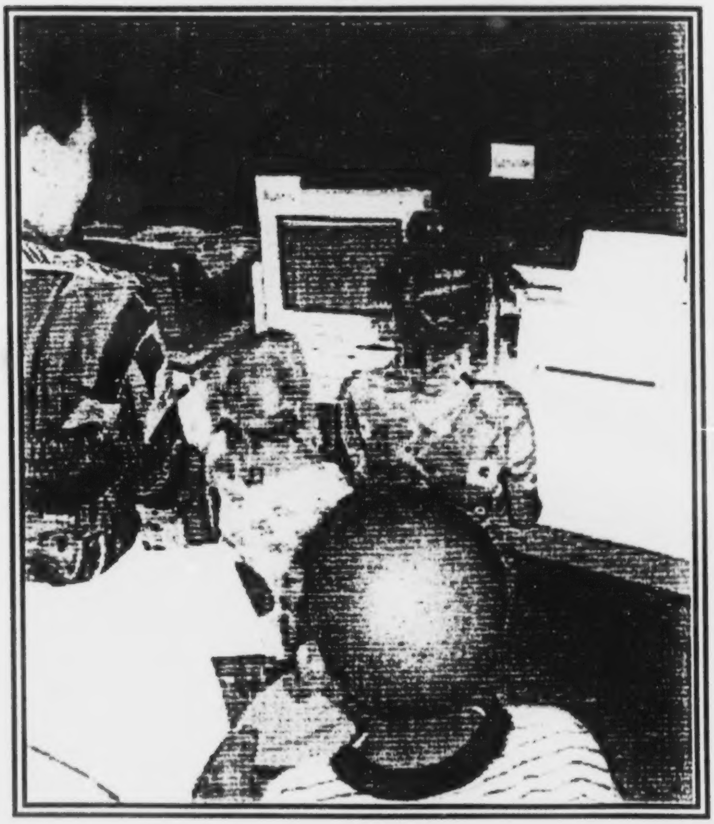
Chapter Two

The Learning Environment



Learning Environments

No matter what a child's age or disability is, his/her degree of success in developing skills with the help of technology depends to a large extent on the learning environment. Before you actually begin using a computer in any program, consider the management of computer equipment and software and the environmental design. Allocate time before using the equipment to organize an efficient and well managed computer center. Organizing software and equipment will provide easy accessibility and will assist the teacher when developing a lesson plan or curriculum activity. Attention to environmental design provides children with a computer learning environment that is safe, pleasant, interesting, and accessible. The following sections provide information for setting up learning environments for two age groups—preschool children and children ages birth to three—and for children with severe disabilities. Information in the Preschool section applies to the other sections also. The Birth to Three section and Severe Disabilities section offer suggestions especially for those groups.

Preschool Environments

Setting up a learning environment for the preschool child with special needs is an important aspect of designing a computer activity. *Building InterACTTive Futures* uses a problem solving approach with preschoolers to stimulate their thinking skills. Organize the environment so children discover ideas and develop theories on their own. The environment should allow them some instant success (a software program where any key pressed on the computer elicits a response on the monitor) and then challenge them by offering a pre-selected variety of options.

Equipment Considerations

- Place the computer against a wall near an outlet and tape cords securely to the floor to avoid accidents.
- Use a surge suppressor to protect the computer from voltage surges which can damage hardware and erase memory.
- Place the computer away from direct sunlight. Floppy disks and computer chips can be damaged by direct sunlight and extremes in temperature.
- Select a low traffic area for the computer center. This area should be well defined, allowing the teacher to see what is going on, but limiting distractions for the child.
- Place the computer on a table without a rug beneath it or use carpeting approved for use with computers (containing copper in the backing) to avoid static electricity which can cause your computer or software to operate unpredictably.
- Place the computer on a low table; positioning the monitor on the floor may be suitable for some children.
- Adjust the height of the monitor to a comfortable angle for the child. This may mean special adjustment for a child in a wheelchair or adaptive seating device.
- Have an index file close to the computer center to keep track of the goals being targeted, the level the child is working on in a specific software program, and any adaptive equipment a child requires.
- Keep original software and CD-ROMs in disk containers away from direct sunlight and any type of magnetic field (including fans, motors, and even the monitor).

Space Design and Computer-Related Activities

Provide an interesting, approachable environment for the children in a defined area in the classroom. Low partitions such as bookshelves offer children using the computer center some limitations from outside distractions but still allow you to see what is going on in the center.

Place the computer on a table or cart at the appropriate height for the child. In an inclusive classroom, use a table with adjustable legs which allows the table top to be raised or lowered to accommodate a child in a wheelchair.

Leave at least two chairs at the computer center and encourage children to work together to develop cooperative learning, language, and social skills.

Be sure there is appropriate space for more than one child in a wheelchair to use the computer at a time or for the computer to be placed on the floor for a child to use in various positions. Placing a small table and chair in the computer center will facilitate moving the monitor and keyboard so that an ambulatory child can view the monitor just as comfortably as a child in a wheelchair. The location of outlets in the room will also play a major role in establishing where the computer is placed. Tape electrical cords against the wall or floor, when necessary, to enable wheelchairs to move freely.

Position the color monitor at eye level and within reach so children can point to things. Consult a physical or occupational therapist regarding proper positioning of a child in a wheelchair or other apparatus and discuss possible input devices as alternatives if the child lacks the fine motor control the mouse or keyboard requires.

If children don't need to access the keyboard, present them with the monitor and the mouse or a switch. Move the computer and keyboard away from the field of vision, but within your reach for easy access in case you need to make selections in the programs. A long monitor cord and switch cable will give you the flexibility of putting the computer in one place and the monitor and switch in another.

Use cards for each child to record information. State the appropriate software along with related goals from the IEPs or IFSPs. Record dates of when the objectives were begun and when they were achieved. When the teacher, program assistant, substitute teacher, or family member assists the child at the computer, it would be helpful to chart the software use. Indicate whether it has several different levels or if a specific game is to be used. The level number or name of the game may be included. Information on positioning as well as special adaptations (type of switch and its location relative to the child, pointing apparatus, preferred input device) may also be very helpful. These cards, along with a pencil, may be kept in a folder close to the computer or in a pocket attached to the side of the computer or on the computer cart or table. Information of this sort is not only helpful for the person assisting the child, but also provides and supports excellent documentation for the teacher as well as for the parent.

Offer children choices. Create a "Computer Center" choice board by using recycled board or poster board. To create the sign, use *Print Shop Deluxe* (Brøderbund, 1994). Reduce the size if necessary. Divide the board in 2, 3, or 4 sections. Laminate the whole board. Place female Velcro in the center of each section. Create icons by selecting graphics that provide a good representation of the software. Print out the graphics using a color ribbon; then laminate. Place the male Velcro on the back of the icons. Icons can be easily changed to support the curriculum. This board could be used to select computer program or off-computer activities.

To make choices with touch tablet programs, the overlays themselves can be displayed in an accessible area for children to select. By picking up the overlay or pointing to one, the child can indicate which program he wants to use.

The computer center should extend to other areas of the classroom. Many computer-related activities can be done in small groups which need a larger activity area. For example, provide computer-related activities for "The Fripple Shop" *in Thinkin' Things* (Edmark, 1995*)*. Children can make paper bag figures and discuss the many characteristics of a Fripple. A child-size shop made out of cardboard will give children the opportunity to experience buying and selling Fripples before and after using the software.

Computer-related activities encourage the transfer and generalization of skills and concepts, complementing the knowledge gained at the computer. In turn, the computer activities can be used to reinforce concepts taught in another area of the curriculum. Integrating the computer into the preschool special education classroom takes time. Designing computer and computer-related activities that reinforce children's skills will help you use the computer as an integral part of the curriculum. Examples of learning activities are provided in the curriculum activities section. Check the "Related Activities" provided in each activity for examples. Keep these materials on the shelves of the center. Support materials allow children to examine additional concepts (such as tallest, more, on top of) introduced in software programs. Presentation of a concept from two dimensional to three dimensional and back again develops the flexibility of a concept. The more experiences the child has with each concept, using as many senses as possible, the more the concept will be internalized.

Include items in the computer center which correspond with objects in the software such as paper dolls, puzzles, games (similar to the items in *Pippi*), blocks, colored beads, pencils and paper, for building a house or making a bug, such as the ones in *Millie's Math House* (Edmark, 1992). Do screen dumps of favorite software programs and use these as patterns to reproduce the characters in a flannel board version of the story. As you become familiar with the software, you will identify useful items to provide further instances of concepts across experiences.

Evaluate the computer center regularly. Consider the distractions present within and without. Classroom noise level and traffic paths may distract children. You may need to move the computer center to a new location or plan less distracting activities for others working near the computer area. Speech, music, and sound effects are likely to distract a child in the reading center. Consider all these factors when laying out the computer center and rearrange the room accordingly.

Make sure the center is a safe place to work. Are cords and peripherals tucked away when not in use? Is the electrical outlet safe? Are the CD-ROMs protected in storage containers? Do you have a static electricity problem? What about magnetic fields? Some of these problems will be easier to overcome than others. Take precautions to safeguard both the children and the equipment.

To encourage children's familiarity with the written words as well as to reinforce the word-object relationship, place the names of the computer parts on each component of the system. Discuss with the children the rules for the computer center and for disk handling (e.g., food or drinks only in the snack area, clean hands at the computer). Encourage children to draw pictures to illustrate one of the rules or instructions for operating the equipment; then post their pictures in the center. Reminders help foster the children's independent computer use.

Equipment Recommendations

Certain items can greatly improve the effectiveness of the computer station. Suggestions for children with severe or multiple disabilities are indicated. The following is certainly not inclusive, but serves as a good starting point.

- Computer cart on wheels: If it has adjustable table and shelf height, a standard computer cart can be used to provide eye level monitor placement for most children who use wheelchairs. Depending on the size of the wheelchair, the top shelf of the cart may need to be removed entirely.
- Smaller table with chair: Ambulatory children may need a different size table for appropriate computer/monitor placement. Their feet should touch the floor comfortably when they are using the computer. If the keyboard is not used, an input device and the monitor may be placed on the table with the keyboard hidden from view to reduce extra stimuli.
- Surge protector: Many schools are located in older buildings which have non-grounded plugs. Some schools may have three pronged outlets without correct grounding. To protect the equipment from electrical damage, purchase a surge protector. Prices range from $10 to over $100 depending on customized features.
- Power strip: Some power strips will protect the equipment from electrical surges as well as provide additional outlets.
- Disk storage box: Store the "originals" of software programs in a disk storage box in a safe place. Disks can be arranged alphabetically or by type or input method. Documentation should be organized in the same manner as the software and kept in a file cabinet or other storage container

easily accessible to all staff. CD-ROMs should be kept in a disk box in the computer center for easy access by children. Customized set-up disks for individual children may be arranged according to children's names. This way, staff can simply look for a child's name, select the disk, and use it with little assistance. If the staff is fairly new to computer use with children, put a list of helpful hints near the computer which include the peripherals required, an outline of the instructions for software use, and specific teaching instructions or applications for each individual child.

- Color printer: Select a printer which can be used with either black and white or color options to print both graphics and text. Children who do not have the motor ability to draw on paper can use a drawing program and print their drawings to take home. Children using augmentative communication programs can write short notes to family members (depending on the software used). Teachers can write IEPs, and adults can design calendars and newsletters as well as use the computer for other record keeping tasks. Record keeping software with a hard copy print out option can provide useful documentation for measuring skill mastery. Computer screens and scanned images can be printed to create off-computer materials.
- Switch interface: Several companies make switch interfaces which children can use with software written specifically for single switch input. Other programs can be adapted for switch use through *Discover:Kenx* (Johnston, 1997) or the IntelliKeys.
- Various adaptive plugs and jacks: Some simple circuit devices to consider for classroom use are: (1) a switch extender (a length of wire which connects the switch to the switch interface and allows the child to be positioned at a distance from the computer), (2) double plugs to one jack adapter (allows the child to operate two devices with a single switch press), and (3) double jacks to one plug (allows two children to operate the same toy or computer program).
- Touch tablets: A variety of touch tablets such as the TouchWindow, Key Largo, and IntelliKeys are available for young children's use. Each device has advantages and disadvantages and must be evaluated before being recommended for an individual child. Specialized software may be required for some devices.
- Clamps, tape, or other securing devices: The keyboard, switch, or other input device should be placed in a secure manner, be stable, and not hamper or distract the child from her objective.

Packing and Moving Computer Equipment

Sometimes teachers will take their computers and printers home during the holidays and breaks. This is often encouraged, because it allows the teachers to spend time on the computer for both school and personal work.

If equipment is moved a long distance, from one building to another, or from school to a home, use a computer and/or printer traveling case. Computer cases can be purchased from computer suppliers. If not, save the original packing boxes for moving the equipment.

When moving a computer, follow these tips:

- Turn off the computer.
- Label all cords from the computer system before disconnecting them. Labels will assist you when you assemble the computer again.
- Unplug the computer system.
- Disconnect the monitor cord from the computer.
- Disconnect the keyboard from the CPU (Central Processing Unit).
- Place the CPU in the computer case.
- If your computer case is large enough for your whole system, place the monitor on top of the CPU. Place extra packaging material (foam) in front of the monitor's screen.
- Place keyboard and cords in computer case.
- Close the case and transport with care.
- Or repack the computer system in its original packing materials and transport with care.

If moving an ink jet printer:

- Turn off the printer.
- Open the printer cover and remove all ink cartridges, setting them aside on a piece of paper.
- Place a piece of tape on each opening of the ink cartridges and put the cartridge in a cartridge container. If ink has smeared or spilled, do not put the cartridge back into the printer.
- Close the printer cover.
- Turn on the printer.
- Super clean the print head. See your documentation. You will see an error message because the ink cartridges aren't installed. Click Cancel.
- Turn off the printer again.
- Remove any paper from the sheet feeder.
- Remove the power cord and printer cable.
- Push the paper support and paper tray back inside the printer.
- Repack the printer in its original packing materials or printer case.
- If the ink cartridge does spill onto the print head or interior, use a dry cloth or Q-tips to clean the interior. Do not use any liquid cleaners inside the printer.

Hardware Management

Provide ample storage for all adaptive computer equipment and software where it is easily obtained yet out of the way. Depending on the children's disabilities and the extent to which peripherals are required, a variety of equipment may need to be stored and maintained. Train the entire staff on equipment storage, use, and maintenance before opening a computer center in your classroom. Store each device in a clearly labeled, covered container or closet to prevent dust from settling on it. The correct name of each piece of equipment, its function or purpose, and the names of the children who are using it should be written on an easily read. The more equipment available for use, the longer it may take to locate, connect, and change the adapted devices to meet the needs of each child who uses the computer.

A peripheral cord should be coiled around a piece of cardboard with a rubber band loosely holding it together. Often, cords wrapped directly around a switch are too tight, causing the switch to remain in a constantly pressed "on" position and damaging the switching mechanism.

Color code cords and the slots or peripherals they connect to with tape or stickers to facilitate hooking up the computer and peripherals. This will help to identify equipment should it be sent to a different classroom, training room, or repair shop.

Wipe peripheral devices with a clean damp cloth periodically to clean them and prevent them from sticking. Use keyboard covers when necessary to prevent damage to the keyboard from children who drool. When equipment is sent home with children, provide good modeling for parents by the way that you pack the equipment. In addition, conduct workshops to familiarize parents with the computer equipment so they will feel comfortable using it at home with their children.

Use a clear plastic envelope on the side of the monitor to identify slot identification of an Apple IIe or Apple IIGS computer. Insert a card that will provide vital information about your computer such as where the firmware cards have been inserted onto the logic board, RAM memory, and what the system speed has been set to or volume control. The system software on newer computers contains this information.

Maintain records of the maintenance procedures along with trouble shooting techniques close to the computer in a small notebook, index file, or folder. Have a notebook accessible at the computer center with vital notes such as the correct phonetic spelling of children's names.

Software Organization

Develop a system for management to fit the needs of your classroom or school. For instance, group software according to skill area (problem solving, cause and effect, social interaction, turn taking, listening skills, or scanning) to them, or to input device (keyboard, switch, PowerPad, TouchWindow, Muppet Learning Keys, Key Largo, & IntelliKeys). As you begin to use the software within the classroom, you may notice you'll want to change the software system according to use. Because it is just as equally important for the teacher to use the computer as a tool, add a section for teacher use (word processing, IFSPs, IEPs, telecommunication). After the software has been organized, mark the program in each section with a small colored sticker on the disk sleeve. More than one colored sticker could be placed on each sleeve. Make a chart as a simple key to identify each color sticker. Laminate the chart for durability and place it near the computer center.

Using a word processing program, create a database for the classroom software and peripherals. Include information such as purchase date, price, place of purchase, system requirements, and description.

Software documentation can be organized in many ways for Apple software. Label the disk sleeve with the name of the software that goes inside. Attach pockets to the disk sleeve to hold a mini-version of the documentation. Another way to keep track of documentation is to use cards the size of a diskette. Copy helpful information from the manual (reduce if necessary), attach to a card, and laminate. Place the documentation in the diskette file next to the associated programs. This will help eliminate the time-consuming search for bulky documentation.

Create storage pockets on the back of Key Largo, IntelliKeys, or PowerPad. Cut a piece of poster board to fit the back side of the device's indentation, laminate for durability, and attach with tape or Velcro on three sides of the pocket. To keep the contents from coming out, attach Velcro to the open side.

Use manila folders for off-computer materials. Glue printed icons from software programs to the front of the folder. Place materials such as books, puzzles, or games in the folders.

Birth to Three Environments

Environment plays an important role in the outcome of a curriculum activity for the very young child with special needs. Factors which can affect her level of response include switch type and replacement, body position, location of the monitor or toy, room lighting, acoustics, and distractions. Input from parents and support professionals, such as physical therapists, vision and hearing specialists, occupational therapists, speech and language specialists, and physicians is essential in the consideration of environmental factors.

Child Positioning

The position of the child's body and the placement of the equipment are the two most critical factors affecting the level and duration of the child's response. Without proper positioning and placement, children are unable to initiate control over any aspect of their environment. Early sensory perception and cognitive development are affected by the child's position. Input from a physical therapist is essential in determining whether the child needs to be placed prone over a roll on the floor, in a chair, or in another position. Infants and toddlers have a strong need for stability and predictability in their environment. The consistency, comfort, and stability of their positions should allow them to concentrate on the activity. See the section on "Positioning Strategies" in the "Environments for Children with Severe Disabilities" section.

Equipment Placement

During initial switch activities with toys, present the switch in a position accessible to the child. When focusing on the single set of auditory stimuli, such as music, it may be desirable to place the source of the sound out of the child's visual field, so that he concentrates only on the switch. When the switch is pressed, an auditory response is heard without any visual distraction. Choosing what to present in the child's immediate environment depends on his ability to focus on varying amounts of stimuli. If it is appropriate to present a moving toy to the child, the toy should stay within the child's visual field so that he does not lose track of it.

The switch should be held firmly in place (easily accessible to the child but not activated by the child in his "resting" position). It should not shift when activated by the child.

When using single switch software, present only the monitor and switch in the immediate environment. Because young children love color and colorful software is exciting and attention-grabbing, a color monitor is essential. The monitor and switch can be moved to a separate area from the keyboard, the disk drives, and the computer with a long video cord for the monitor and an extension connection for the switch. By seeing only the monitor and switch, the child more readily associates the switch press to the response on the monitor and is not confused by such factors as the power light on the computer.

This same principle also applies when other peripherals are the focus of the activity. When a touch tablet, such as Key Largo or IntelliKeys is used, limit the environment to only the device and the monitor. In a small group activity, center the tablet on a low table within reach of all the children with the monitor placed toward the back of the table. Or consider seating the children on the floor and placing the monitor on the floor or on a low table nearby. The touch tablet can be passed among the children.

Monitor placement is an important factor whether a switch or the keyboard is being used for a computer activity. The monitor should be placed at a comfortable eye level for the child. If he is required to hold his head back to look up at the monitor, he will tire quickly and will not be able to perform optimally. When an activity is conducted with a small group of children, consider the height of the monitor in relation to the children's eye level and place equipment so children can concentrate on the activity rather than on their discomfort caused by improper body positioning or equipment placement.

Determining Switches

Determining the appropriate switch type is also an important factor to consider in conjunction with body positioning. To determine the type of switch the child can control with the greatest ease, begin by examining the child's present physical abilities for the most reliable body movements. Because switches vary in design and effort needed to activate them, the child's most reliable movements will be deciding factors as the choice for a switch is made. Another factor to consider is the child's current concept of cause and effect. During initial stages of cognitive development, a switch which is activated by the least amount of pressure will help the child begin to realize her own role in causing the result. See the switch section in this curriculum guide for more information on switches. Refer to Macomb Projects' videotape and manual, *Constructing a Battery Interrupter and Tread Switch*, or to *A Switch to Turn Kids On* for information about constructing inexpensive switches, battery interrupters, switch interfaces, and other connectors.

Limiting Distractions

Keep the room setting for any activity as familiar and natural as possible. If you are conducting home visits, the parent should help you choose an appropriate location in the home which can be consistently used for the child's activities. It is easy to overlook details like background noises, so if the focus of the activity is auditory stimulus received from a tape recorder, toy, or software program, pay particular attention to the noises in the home. The young child may have difficulty focusing on the source of the sound if he is receiving constant noise from the environment. Even though sounds from a radio or television seem to be a natural part of the environment, when overlooked in setting up an activity for the child, these same sounds compete with the auditory stimulus of the activity. When sessions are conducted in a large room, such as a church or community center basement or at a center-based program, poor acoustics contribute to noise distractions. It may be difficult for a child to determine the source of a sound when it appears to be surrounding her in a large room. Placing dividers in the room so the immediate environment is more confined may help her to concentrate on the sensory component of the activity.

When the activity centers on a visual stimulus, consider the amount of visual distractions in the child's immediate environment. To determine what the child is able to see at a certain level, place yourself at the same level as the child. Darken the room slightly on a sunny day by closing the curtains to help the child focus on a lighted toy or to reduce glare on the monitor. If the lighting in the room produces too much glare on the monitor, a special glare-reduction screen may be needed.

Environments for Children with Severe Disabilities

Computer activities can provide many positive changes in the lives of children with severe disabilities; therefore, the importance of the computer learning environment cannot be underestimated. Although experimenting and constant re-evaluating are necessary to find the appropriate placement for the computer equipment and the child, increasing the child's ability to function independently is well worth the effort. Don't allow preconceived concepts of the child's abilities limit the activities you attempt with her on the computer. The child will experience some degree of success once you have found the right combination of equipment, software, and body positioning. This section will discuss strategies and factors affecting the child's performance.

Positioning Strategies

Positioning strategies for optimal computer access are extremely important for children with physical disabilities. When first determining the best position for a specific child's computer access, consult with the child's family and an occupational or physical therapist. If the child is visually impaired, the vision consultant should be part of the team. Some position aspects to consider are:

- In which position is the child most comfortable?
- What is the child's resting position?
- How long should the child stay in one position at a time?
- What are the child's most reliable, consistent movements? (They may vary depending on what position the child is in.)

Perception and the ability to integrate motor control with vision or hearing also play an important role in determining the most comfortable, consistent position for the child. Placing the child at a slant in relation to the monitor may improve his ability to use the input device and maintain his visual attending. Consider these questions:

- How long can the child visually attend to the monitor?
- Can the child visually track an item across midline?
- Can he work with his eyes in midline?
- How does the child coordinate his eyes and his motor skills? Does she have to look at her hand to operate the input device? How difficult is it for her to maintain visual attending while operating the computer?)
- Does the child rely on vision or hearing to operate the computer?

Once the best position is determined for the child, the type of input device or the way the computer will be operated by the child should be addressed. Switches are available in many shapes and sizes and may be adapted for each child's individual needs. Refer to "Switch Determination" in "Birth to Three Environments" for suggestions.

Alternate Input and Equipment Placement

Since abilities in a classroom of children with severe disabilities vary greatly, conduct a careful assessment of each individual's needs. Children who are physically able to use the keyboard may find it overstimulating or they may not have the eye-hand coordination needed to operate the mouse. Consider alternate input devices. Some can use touch tablets quite effectively; others might need a single switch device. Discriminating among the keys (especially programs which use keys located on opposite sides of the keyboard) may be difficult for some. Adding stickers or small overlays to the keys may be helpful, but stickers may be too distracting. The child may prefer to play with stickers rather than use them as references. If single switch use is most appropriate, then using only the monitor and the switch (without the keyboard in view) should reduce distractions. The location of the color monitor should be carefully evaluated, especially if the child is prone to seizures. Observe the child's seizure activity both during computer use and throughout the day to make sure seizures do not increase with computer use.

If the child can use the mouse, be sure she can comfortably reach and move the device. The mouse and pad should be positioned in front of the monitor with the keyboard hidden from view. Depending on the child's hand preference and physical abilities, the mouse will be placed to the right, left or at midline.

Useful Tips

Obtaining information from the family and support professionals who work with the child helps ensure an effective environmental design. Consider the child's position, most reliable body movements, resting position, physical abilities, sensory awareness, and level of cognitive development. The family and professionals who know the child can provide you with information that would take hours of personal observation to gain.

Keep toys, switches, and other equipment in the visual field to a minimum to avoid confusing the child. Place equipment with the comfort of the child in mind. Use switches that are easy for the child to operate. Make sure interesting sounds are contained in the software for children, especially those with visual impairments. Adapt materials and activities so all children can participate.

Integrating environmental factors will determine the degree to which a child is able to respond and will impact his/her success. Through continuous assessment of a child's abilities and of environmental factors, you can provide progressive opportunities for achieving developmental skills.

Computer Equipment

Using Older Technology

Not having the latest and greatest computer in your classroom or home is no excuse for not using the computer with children. Granted, using older equipment has certain disadvantages, but using even old technology will benefit children more than using no technology. After all, today's "old" equipment was lauded a few years ago as great educational tools.

A disadvantage of using older computers is that software graphics are less vivid, animations are more awkward, and sounds are less realistic than they are in software supporting newer technology. New programs are not being developed for the older computers, as developers turn their attention to the new machines. Also, finding support services for older equipment is becoming increasingly difficult.

Using older equipment can be advantageous because it increases the number of computers in the classroom. Some people who have purchased newer models for their homes or businesses will donate older models. Create a lending library of older computers for families. Keep in mind that donated computer systems may not always be complete. If the system is missing parts, local fund-raising may be needed to obtain all of the components.

Another advantage of using older technology is that teachers and families may be less inclined to worry about equipment damage and may use the older computer more freely with the children.

Even old equipment may meet a young child's needs. A two-year old can happily explore the appearance and disappearance of the little creature in *Creature Antics* (Laureate, 1995) using an Apple II series computer with the TouchWindow. Another child might improve cognitive skills by using a simple switch attached to an Apple II +.

Purchasing Hardware

Today, most software is available for both Mac or PC. The Macintosh is still dominant in design, education, and early childhood fields. Most businesses are inclined to use PCs, and Windows. The PCs and Macs now have much more in common than ever before, a trend that is likely to continue.

Whether you decide to purchase a Mac or a PC, purchase a system that provides plenty of working space and storage for programs. A color monitor separate from the CPU (Central Processing Unit) is recommended. Monitors that are built into the rest of the computer system are not adjustable and may not meet the needs of some children. An internal CD-ROM drive is essential for using newer programs available on CD-ROM. Future computers will have built-in Zip Drives. Zip cartridges will allow for additional storage and are great for storing child created products and classroom data. A microphone is recommended to record voices for some software programs (such as *KidDesk*) and for augmentative communication applications.

If you are planning on buying a computer system for a young child with disabilities or a classroom, answer the following questions:

- Is technology training available for your computer system?
- Is reliable technical support available?
- Can the computer be adapted for children with disabilities?
- Is age and developmentally appropriate software available?
- Is age and developmentally appropriate software with options available (such as input and scanning)?
- Will the computer system support switch accessible software, if needed?
- What computer system are most children with disabilities using?
- What computer system is the school district using?
- What computer systems do vendors who assist children with disabilities support?
- Is the system easily accessible?

Discover:Kenx (an alternate computer access device by Don Johnston Inc.) and IntelliKeys (an alternate computer access device by IntelliTools) will allow young users with disabilities to communicate and control the computer with ease. Both interface systems are powerful, relatively inexpensive, and easy for both facilitator and user to access. Questions need to be asked about adaptability and customizing to meet the needs of young children with special needs.

- Is the system compatible with existing peripherals in the school, such as CD-ROM drive, *Discover: Kenx*, IntelliKeys, augmentative communication device, or a switch input box?
- Is the system upgradable and/or expandable, allowing it to "grow" with your child and family?
- Does the system have enough processor speed and RAM to allow you to run software you plan to use? If not, what will be the cost to upgrade?
- Is the hard drive on the system large enough? Does it have enough storage space to install all of your early childhood software and adult applications?
- How long will the new system fit into your child's educational plan?
- Can you easily remove and install software for your classroom or a child?
- Can you easily change the peripherals for the classroom or child?

Printers

Printers vary in terms of technology employed, features offered, speed, output quality, and price. Choosing the correct printer for a classroom or home depends entirely on the application for which it is needed; for example, not all printers are capable of printing in color, or printing "letter quality" text. A basic understanding of how various printers work can help to determine which printers will support features necessary to meet any specific need.

Three types of printers are marketed, characterized by the amount of information that is printed simultaneously. They are character printers, line printers, and page printers. Character printers print a document one character at a time. They are generally the slowest and most noisy because of the number of repetitive actions. The dot-matrix printer is a character printer. Line printers are faster than character printers, printing an entire line in one movement and are often used in industrial applications in which large volumes of print are being produced. Page printers work by printing an entire page in one motion. Print is transferred electronically to the paper instead of the print head beating the platen. It is referred to as non-impact or laser printing.

Keep in mind that the printer's ability to perform an application is contingent upon the machine and the software which runs it. Numerous printers are available in today's market and costs vary depending on printer quality and characteristics. As printer technology is perfected, prices will become more affordable for both home and classroom

Dot Matrix Printers

The moving print head of a dot matrix printer skates along the platen of the printer, imprinting the image of a letter through an inked ribbon. The image of the letter is then transferred to the paper wound around the platen. This printer has one moving element and letters are formed by a number of wires or pins embedded in the print head. As the printer receives the signal from the software to form a particular letter, a certain combination of the wires will extend from the print head to make the impression against the ribbon. To save time wasted in waiting for the carriage return, the head works in a bi-directional mode: it prints left to right across the page and then prints the following line right to left on its return trip.

The dot matrix printer generally prints at speeds of 50 characters or more per second. Each letter is made up of a matrix of closely spaced dots (the imprints of the wire ends or pins). The closer the dots are to each other the sharper the image. Dot matrix printers are manufactured as 9-pin to 24 and 36-pin models and are priced accordingly. They provide "draft quality" printing at a low cost and the option to use continuous-form printer paper, making them particularly useful for applications that print out long reports or other documents that do not have to be of "letter quality."

Inkjet Printers

The newest innovation in line printers is the economical and quiet inkjet printer. The inkjet printer works by shooting a spray of ink through a nozzle in the moving print head directly onto the paper.

Inkjet printers have the flexibility of printing in color and in any number of fonts and graphic formats. Because the spray of ink is so fine and precise, the shape of the letters is more exact than that of the dot matrix and "near letter quality." If water-soluble ink is used, care should be taken that the document does not get wet. The ink will run. Having so few moving parts, these machines make almost no noise.

Laser Printers

The technology of non impact printers, such as laser printers, is very similar to that of modern photocopy machines. The software sends the image of a page to the printer and this image is transferred to a magnetically charged rotating drum within the printer. Particles of negatively charged toner (a fine dry powder instead of ink) stick to the positively charged magnetic "image" on the drum. The drum rotates as a sheet of paper passes under it, transferring the toner from the drum to the paper. In a final step, the toner is affixed to the paper with heat via a small laser beam.

The characters are formed with a matrix of closely spaced dots. The type density of most commonly used laser printers is 300 dots per inch (DPI), but more expensive printers can produce up to 1200 DPI. High or low resolution is defined by the DPI— the more dots per inch, the higher the resolution and the sharper the image. The printing speed depends on the capacity of the machine and the number of font changes or graphics in a document, but it will yield between 4 and 8 pages per minute. The per-page cost is lower for laser printers; however, the initial investment in the printer and supplies is greater than for other machines. Laser printers are sensitive to the paper used. The heat of the laser will melt the resin on paper that has been thermographed and cause the plastic to stick to the rotating drum. Heat also causes labels to work free from their backing and to adhere to the drum, making it impossible to print.

Printer Paper

Most printers accept paper weighing between 16 and 24 pounds, 20 pound being the recommended weight and cotton bond the best choice for content. Variations in paper composition may significantly affect print quality, but for general applications, most plain paper manufactured for high-quality photocopying works well. Plain paper almost always has one side better for printing, marked with an arrow on the end of the package. Care should be taken to load the paper correctly. As a rule, the heavier paper and smoother surfaces print clearer, sharper images; colors appear more vibrant and richer on premium coated paper. Very smooth or shiny surfaces and highly textured paper may not print as well. It is best to test the print quality before making a final copy of any important documents.

Purchasing Software

No matter how expensive or advanced the computer system, without software, computers are useless. Carefully select software and pair it with a child-friendly computer center. The technology center can come alive as children read stories, draw pictures, and explore interactive programs.

When purchasing children's software, keep the following tips in mind. Appropriate early childhood software:

- is designed around strong content that is interesting, engaging, and addresses a range of topics including children's real life experiences and imaginative situations.
- contains exploration and discovery rather than drill and practice activities.
- addresses cognitive abilities that require decision making, judgments, and that invite further exploration.
- avoids an overload of sensory stimulation.
- contains more than one activity.
- does not reflect gender, cultural, or racial stereotypes.
- allows user to select different text options (e.g., reading the text, having the text read, highlighting the text).
- appeals to multi-sensory learning styles.
- has novelty and surprise built into the design.
- encourages play and imagination.
- offers a high degree of interactivity.
- allows children to make decisions and to develop responsibility for their actions.
- provides natural or logical consequences for choices made.
- enables children to acquire problem solving strategies that are transferable from one situation to another.
- contains icons easily understood by children.
- allows children to operate the program independently by icons rather than reading.
- offers various levels of difficulty.
- loads quickly.

- provides instant feedback.
- contains an on-screen help option.
- allows user to interrupt animation.
- contains clear, understandable speech.
- contains clear, simple, colorful images and graphics.
- is free from distracting elements.
- offers smooth and immediate, not slow and jerky, animation.
- contains error messages that are not negative and criticizing.
- offers children opportunities to make another choice.
- offers alternative input capabilities (e.g. switch input).

An array of early childhood programs are marketed. Mail order catalogs, retail stores, and other resources promote software through colorful ads and catchy descriptions. Since all software is not created equal, evaluating appropriateness is critical before the software is used with children. A Macomb Projects resource, *Good Leads for Software Needs*, contains an annotated listing of appropriate software titles for young children with disabilities. Teachers and families may find this and similar resources valuable prior to making software purchases.

Problem Solving Strategies and Teaching Techniques

Some children have few opportunities to take an active role in their learning. Often adults are in control of the learning situation. They present material and the child responds to it. Using *Building InterACTTive Futures* provides suggestions for setting up environments which encourage children to experiment and take control of their learning. As children become more active participants in classroom activities, the teacher becomes a "guide."

A guide will not evaluate the child's operation of the software as right or wrong, but will instead describe what the child has done and offer suggestions for guiding the child in another direction. If a child is having difficulty operating a program, instead of saying, "No, that's not right!" try saying, "You are clicking the red arrow. What would happen if you tried clicking something else? What are you going to try next?" Many children will be eager to find the responsive area as they try other locations on the screen or keyboard. Some children will continue to click the "unresponsive" spot if they gain attention from the teacher. Describing to the child what he is doing is less threatening than pointing out that he is doing something wrong. Sometimes doing nothing forces the child to take action of his own.

Some children need a little time before they understand that answers are not going to be provided without some thought on their part. Provide the child with some possible strategies for solving problems and activities that involve logical and sequential thought. Then let the child work it out.

When interacting with a child, use open ended questions that require the child to do some thinking. Questions like, *How did you make this happen? How can you do that again? What did you want the computer to do instead of this? How do you think you can make it happen your way? Did you find a short cut? If you tried...and...and...then you were very close. How did you know that? What would happen if you...? Why did you...? How could you teach Amy how to do this? Tell me about it? What did you do first...next...last?* stimulate children's thinking.

Questions that encourage the child to predict or estimate outcomes stimulate solutions to problem situations. When asked frequently, open-ended questions stimulate the child's thinking and the answers demonstrate the child's current knowledge. This form of teacher-child interaction encourages observing the learning style of each child and helps determine the next appropriate instructional concept.

One teacher relates her approach to children's questions: *"I tell the children to ask a friend before they ask me. When they've asked two friends and get no answer, they can come and ask me again, and I will help."* This method involves peer interaction, problem solving, and general processing skills.

Encourage children to learn from each other. By using "Computer Experts Chart," children will know which classmates to ask and where to go for help. Choose four or six software programs that children can use during "free time" activity. Make one screen snapshot for each program and print it out on a full sheet mailing label. Adhere the screen snapshots to a large, laminated posterboard in a vertical column down the left side. Any screen snapshots you don't want to use at any given time can be stuck to the back of the chart. The laminating allows you to pull them off and reuse them. Reduce or enlarge photographs of the children on the photocopy machine or with a scanner and computer, and print them onto a full sheet mailing label. Cut these out and store them on the back of the chart. When a child becomes proficient at a software program, place her picture in the row to the right of the program's screen snapshot on the chart. Other children who have difficulties with the program can go to that child for help.

Desktop Management

Most computers have built-in hard drives, many programs may be installed there to allow the user easy access to software applications. A program such as *KidDesk* is recommended for organizing software choices. *KidDesk* allows children to access selected software programs and prevent them from damaging other programs stored on the hard drive.

If you don't have a program such as *KidDesk*, another option would be to create a folder titled, "Children's software." All children's programs can then be placed in this folder.

Try these tips when working with children and computers:

- Encourage children to do as much as possible for themselves. Guide them as they learn how to access their own *KidDesk* desktop. Encourage them to choose their desktop and suggest they leave messages to other classmates.
- Use the computer in small groups with software programs that encourage children to work together. Children gain valuable social skills when encouraged to group problem solve. Spontaneous language tends to increase through computer use.
- Encourage children to help each other. Assign computer experts for the week. Peer teaching increases on-task behavior and facilitates the acquisition of problem solving skills, independence, and self-esteem.
- Encourage children to discuss their questions with other children who have used the software. Guide children in their development of metacognitive skills by modeling a behavior or talking about the sequence of a process.

Strategies for Integrating the Computer

Introducing a computer center to children can be accomplished in numerous ways. Ask children to assist in generating rules. When children help formulate rules, they are more likely to follow them. Initially the adult may want to work with small groups in the center to guide operating procedures and to encourage group cooperation. Other learning centers should be available while the adult spends time at the computer center. The teacher's role as facilitator at the computer is very important in the beginning.

Even when teachers have the computer in their classroom only two hours a day, an effective learning center may be established. Thoughtful design of the computer environment provides an opportunity for children to take more responsibility for their learning to develop thinking skills. Provide software with related off-computer activities in the computer center. This supports open access to the center, encourages peer cooperation in small groups, and provides a way to integrate the computer center in classroom activities.

Consider the computer as another classroom learning tool. Like books, dress up clothes, blocks, paint, clay, scissors, and crayons, the computer provides its own impetus for learning. It is not a toy or game to be used for reward or punishment; rather, it is an integral part of the classroom that can provide a means for the young child to manipulate the environment to learn and discover information about his world. To deny a child the use of this equipment for not sharing on the playground or to use it as a reward for completing work fosters the view that the computer is an external reinforcer. In addition, using the computer in this manner enables only certain children, namely those who finish their work, to use this tool. Often, the children who do not finish their work are those who could benefit most from using the computer.

Whether using a computer with an individual child or with a group, teaching strategies regarding the computer may vary from strategies used with other curricular media. Here are some helpful hints:

- Know the software features and capabilities.
- Encourage the child to use a switch or peripheral device in other activities whenever possible.
- Allow ample time for the child to respond before prompting.
- Allow the child to do as much as possible independently.
- Use both computer and related activities to reinforce similar concepts.

The roles of the adult and the environment are important for a computer to be fully integrated into a child's curriculum plan. The adult's role is critical in arranging the environment and planning developmentally appropriate activities for the classroom. The computer environment should be prepared so materials are accessible, computer activities are developmentally appropriate and interesting, and the computer is readily available. A child needs time to explore the computer environment to fine tune skills (such as fine motor or tracking) while at the computer.

Group or Individual Work

One feature which makes computer use so flexible is that it may be used effectively with an individual child or with a group of children. In classrooms with children with severe disabilities many curriculum goals are developed for individual instruction. The staff/child ratio is generally low which makes this type of delivery system feasible. Using software "one-on-one" (one computer, one teacher, and one child) is often necessary to insure that relevant goals are met. Individual computer sessions can confirm the appropriateness of the targeted goals, facilitate the adapting of program content to meet specialized needs, and allow for accurate documentation of child performance. In addition, the computer is infinitely patient. It does not get frustrated, provide too much assistance, or require the pressure of a personal relationship ("if I make a mistake, I will upset the teacher"), and therefore, provides a non-threatening learning environment.

However, using the computer with large or small groups is an effective way of encouraging the development of social skills. When children spend most of their days interacting primarily with adults on an individual level, they may not develop appropriate social skills. Using the computer in a group can help a young child experience positive forms of cooperative play and develop social strategies based on interaction with other children. Other experiences such as learning to work with another child to accomplish a goal (two children, each with a switch, control one computer program), supporting another child's efforts through teamwork, and (for very involved children) being aware that there are other children in the room, can all be functional goals. Opportunities for equalized play with another child are also beneficial.

Children should also be given an opportunity to use the computer independently. Initiating an action may be a new experience for many children. Using the computer autonomously can help young children become risk takers. If they do not press their switch (or click the mouse), nothing happens. No one cues them, begs them, or provides them with answers. The relationship is strictly between the child and the computer. If a mistake is made, the machine cues the child and she can correct it by herself. Observing a child using the computer alone can provide new information about her which might be useful in developing educational programming goals.

With consultants and support staff involved in determining the best goals for each child, it is crucial that staff be well trained on how to use the computer, adaptive equipment, and how to integrate the software into the educational goals of each child. All staff who are responsible for carrying out instructional goals should be aware of possible functional computer applications for each child. In this way, the computer can be used as a flexible, functional tool which can provide a young child with disabilities equalized opportunities for interacting with his environment,

Summary

Computer technology provides a new type of prosthesis for children with severe disabilities: a way to speak for nonverbal children, a way to write or draw for the physically impaired, a way to interact and control the environment for a child with multiple disabilities, a way to play with other children in an equalized manner, a way to communicate and participate in communication, a way to help a child develop ownership of responsibility, and a way for him to participate more fully in life. Using the computer as a tool to develop the strengths of the child provides a scaffold to build on his existing strengths and abilities. Forget what a child cannot do and build on what he can do.

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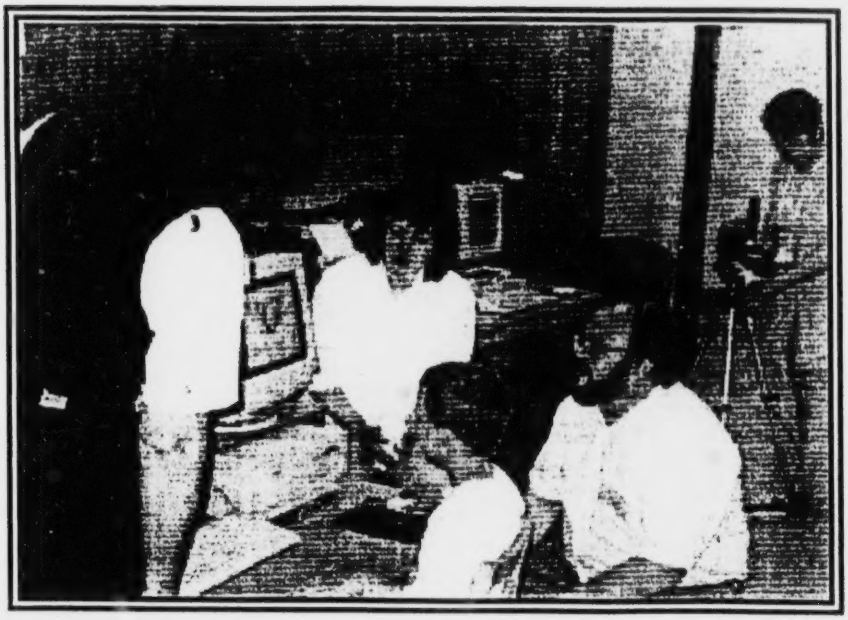
Chapter Three

Family Participation



Families And Technology

Not only are parents and extended family members the first and primary teachers of their children, they are children's life-long advocates. So if young children are to receive the benefits of technology experiences, families are crucial to the entire effort, from the initial decision to explore the possibility of technology use for their children through the day-to-day experiences with equipment and decisions about software. Family members' suggestions enhance the likelihood that computer activities will be appropriate for a particular child. When a mother says that her son "really likes music, but fuzzy textures seem to frighten him," she provides the information needed to determine appropriate initial software and choices for switches.

The 1997 Amendments to the Individuals with Disabilities Education Act, IDEA, P.L. 105-17, includes increased family involvement in the decision-making process concerning their child's program placement and services. Since assistive technology may be a necessary tool for the child, it is important that families are able to make informed decisions in this area. The new legislation states that the IEP (Individual Education Plan) team which includes family members shall "consider whether the child requires assistive devices and services" (NICHCY, 1997). Families of younger children may also benefit from technology information and skills included in the Individual Family Service Plans (IFSP). The section is designed to assist program staff to work closely with families. It includes ideas for family technology workshops and meetings which provide computer information and enhance families computer skills.

Differences in Family Participation

Families require different levels of input into their children's programs, depending on daily living pressures, available time, perceptions of their role as parents, and a myriad of other factors. On one hand, some parents may want the professional to make all the decisions and carry out activities since that is, according to the parents' perception, supposed to be the professional's role. These parents may want information but not participation. On the other hand, some parents wade right in, take major responsibility for all intervention activities, and make informed decisions about future directions for their children. Families' participation ranges on a continuum between the two positions.

Although it is beyond the scope of the *Building InterACTTive Futures*, current literature on early intervention clearly defines family systems and the approaches families from various cultures deem acceptable. A clear understanding of family systems is necessary when decisions about technology applications are being made.

When very young children have severe disabilities, the input and interest of families is more critical to the success of computer applications than it may be for children with mild disabilities in a preschool classroom. If parents or primary caregivers are not committed to the importance of technology applications for their children with severe disabilities, results are diluted. If a young child must use a communication program to indicate what he wants to eat, drink, or play with, using the same or a similar system at home and at school provides continuity, repeated practice, and a better chance of success. In this case, parents need to be directly involved and knowledgeable about the equipment and software. However, direct participation of parents is not critical to the success of a child with mild disabilities who is learning about directionality by moving a LOGO turtle through a maze.

Levels of Family Participation

Parents can be involved in their child's program in many ways. Some parents choose passive involvement, demonstrating awareness and support of their child's activities. Other parents may actively participate in computer activities, learning all they can about computer use for their child and themselves, while others may become active leaders, choosing to plan or assist with activities in the classroom.

Program staff can plan at least three different levels of family involvement, as a result, families can be involved in computer activities in the following ways:

I. Obtain information and observe
    A. Provide input
        1. participate as members of child's technology assessment team
        2. share information on child's preferences, interests, and most reliable movement
    B. Observe computer sessions
        1. record occurrences of selected behaviors for responsiveness
        2. learn about hardware and software possibilities
    C. Receive information
        1. read about technology through newsletters
        2. discuss technology intervention through daily notes
        3. read interesting articles sent home
        4. share computer related activities
        5. receive printed results of children's work related to technology
        6. view videotapes of children actively involved with technology
    D. Participate in workshops
        1. become familiar with the role of technology in the classroom
        2. become aware of computer system and peripherals
        3. learn about different types of software
II. Assist with the computer
    A. Participate in hands-on workshops
        1. explore children's software
        2. learn adult applications
            a) create and print a card or sign
            b) learn how to create a database for home use
        3. learn developmentally appropriate practice
            a) observe appropriate technology teaching strategies
            b) use open ended questions with children
            c) use descriptive reinforcement rather than value-judgment
    B. Facilitate technology activities in classroom
        1. observe children's learning styles
        2. become familiar with software
        3. learn how to operate the computer and peripherals
        4. demonstrate useful teaching styles with child
III. Conduct the computer session
    A. Work with the staff as a team to plan, carry out, and evaluate experiences
    B. Facilitate classroom technology—build and repair switches
        1. design mounts
        2. build adaptive equipment
        3. develop communication boards
        4. plan and carry out technology activities with children
    C. Become advocates for children
        1. make transition from programs easier
        2. know the important role technology places in the continuation of appropriate services and planning for future goals
    D. Conduct workshops
        1. provide computer training for other families
        2. conduct switch workshops
    E. Disseminate information
        1. write newsletters
        2. access software and hardware
        3. maintain software and hardware database

On any level, when family members become active participants in their child's education program and generalize classroom skills to the home, the child becomes more competent in both environments. By sharing knowledge of the child and his disabilities, parents and professionals become partners to provide more appropriate instruction and care for the child. Fewer communication/information gaps exist between home and school, and active family participation allows children to demonstrate accomplishments outside the classroom that might otherwise go unnoticed.

In one sense, the levels are sequential, from first learning about technology applications to a growing sophistication in computer adaptations. However, the choice of participation level will vary depending on family commitments. At all times family members decide upon their own level of participation. We believe that providing inviting opportunities for acquiring further computer skills promotes the potential for increasing involvement. We include activities for each level of involvement together with sections dealing with aspects of birth to three and families of children with severe disabilities as well as preschool classrooms.

Birth to Three

Family Participation in Technology Activities

The first three years of life are marked by many family adjustments. When the child is disabled, efforts at acceptance and adjustments to family life are complicated, at best. Technology benefits for children under three focus primarily on children with moderate to severe disabilities that prevent interaction with elements of the environment. Technology offers parents a degree of hope that their children can become active participants in society. When they get involved in computer intervention early in their children's lives, family members witness children demonstrating the ability to act on objects and to learn in alternative ways. New understanding of children's potential is generated which in turn effects other areas of program participation. Parents may choose to play a variety of roles in computer interventions including information recipient, input provider, observer, switch constructor, computer trainee, intervention assistant, and intervention conductor.

Obtaining Information

In the beginning, parents can participate in computer intervention as information recipients, input providers, and observers. Prior to beginning any technology-related activities, families need information about the nature and benefits of technology intervention as well as possible ways it would affect their children. At this point the most important information can be stated in simple terms, explaining what technology can do for infants and toddlers. Information about applications as the child grows is also relevant. Share concerns or hopes about technology and children with program staff. Encourage questions. After families are informed, they decide whether or not to pursue technology applications for their child.

When family members say, "Yes, we want our child to participate in a technology curriculum," the next step is a technology assessment. Procedures to determine the most appropriate hardware, software, switches, placement, and adaptations are available from TTAP (Technology Team Assessment Process), part of the Macomb Projects. Input from family members prior to and during the assessment is essential on matters related to the child's preferences, interests, and most reliable movements. Family members explain what might be do-able and what is impractical within the family and give valuable input for determining child goals and the Individual Family Service Plan (IFSP).

Observation of intervention sessions constitutes a beginning level of family involvement. Parents can record occurrences of selected behaviors they see their child exhibiting during an intervention session, perhaps finding that their child is more responsive to outside stimuli than they initially thought. Parents may opt not to record behavior occurrences. However, seeing small, progressive changes contributes to the family's responsiveness to the child when he makes an almost imperceptible effort to communicate. Observation also provides opportunities for primary caregivers to learn about the equipment and software and become comfortable with technology before learning to use specific applications.

Assisting with Intervention Activities

When parents of children three and under are ready to assist in technology activities, switch construction is one way to begin. A simple switch and battery interrupter are often the only pieces of equipment parents need to do computer related activities at home. When they construct the switches themselves, parents feel a sense of accomplishment and pride in newfound skills. They also begin to feel more confident as contributing members of the early intervention team.

Making switches and battery interrupters for toys is neither complicated nor expensive. *Advanced Circuitry* and *Constructing A Battery Interrupter and Tread Switch*, two video tapes explaining switch construction are available from Macomb Projects. These videos give step-by-step instructions for making switches and are excellent resources for switch workshops and individual use, as is *A Switch To Turn Kids On*, a switch-making manual.

Teaching individuals to make switches is not difficult. A detailed schematic of the desired switch together with initial training on switch construction during a switch workshop leads to greater competence and more switches! Once trained, a program staff member or a parent can help others make switches.

When parents understand how switches work with battery-operated toys, learning to use a switch as input to a computer does not seem so difficult. After computer instruction, parents may want to assist in intervention sessions.

Conducting Computer Intervention

When parents work directly with children, activities are enjoyable and challenging. Often both child and parent feel great personal satisfaction when they work together successfully. Being part of this success, and sharing experiences with their children, is highly rewarding for parents. Deciding on appropriate activities provides an opportunity for program staff and parents to work together as a team in planning, carrying out, and evaluating experiences.

After family members acquire computer competencies and are confident about their abilities to plan and carry out activities, parent volunteers can be most helpful in the early childhood center or classroom. When parents staff the computer center, staff time is freed for other meaningful interaction with children in other centers. In the classroom or center, parents observe a variety of learning styles and developmental levels of children besides their own as they use different software and related activities.

Family members are wonderful resources for the staff of early intervention programs. Parents can conduct computer interventions, build and repair switches, design switch mounts, build adaptive equipment, and develop communication boards. But most of all, parents serve as advocates for their own children. Transition from one program to another can be a traumatic experience for children and families. However, if the parent oversees this transition it may be easier. What the parents know about computer applications for their children may play a very important role in the continuation of appropriate services and planning for future goals.

Three to Five

Family Participation in Technology Activities

Family involvement levels are similar across ages and disabling conditions. Those who work with the preschool population should refer to the previous sections for general philosophy and practices for working with families.

Family members are more willing to participate in computer activities if they feel comfortable and competent at the computer. Competencies families need to assist and conduct computer activities are listed below.

Family Computer Competencies

Operate the Computer
- Turn the computer on
- Shut down system

Run Software
- Open software file from hard drive
- Start program
- Close software file from hard drive
- Handle CD-ROMs or floppy disks properly
- Insert CD-ROM or floppy disk in drive
- Start CD-ROM or floppy disk application
- Close CD-ROM or floppy disk application
- Remove CD-ROM or floppy disk from device
- Use appropriate commands
- Access Control Panel
- Restart

Operate Peripherals
- Attach touch tablets, switch interfaces, or other peripheral devices to the computer's ADB port
- Insert switches into the appropriate plugs on the switch interface
- Select appropriate peripheral for use with designated software
- Use touch tablet, switch, or other peripheral appropriately with software

Develop Applications
- Use age-appropriate software with children
- Identify computer related activities which would reinforce instructional goals
- Identify software applications which meet IEP goals

Create Learning Environment
- Limit distractions
- Monitor environmental conditions
- Encourage children to seek assistance from peers
- Use questions to help children formulate and test hypotheses
- Use correct computer terms with children during the activities

The adults should also know how to handle equipment properly. Knowing the correct names of the computer components (monitor, disk drive, keyboard) is useful. Computer terminology somewhat overwhelms people at first, but once they learn a few words and can speak the 'lingo,' it's not so frightening. Thorough knowledge of what to expect from a piece of software is important if an adult is going to conduct a computer session.

Obtaining Information

Providing information about classroom computer availability and the intended use of computer activities in the curriculum are the first steps in involving families in educational computing. Two options for providing families with this information are a newsletter and a parent meeting.

A weekly or monthly newsletter sent to all families involved in the program is an excellent way to introduce the computer and computer activities. Read the section on Severe Disabilities for ideas on what such newsletters could contain. Throughout the school year, newsletters can inform families about the new software being used, ways the computer helps children meet IEP goals, and future plans for classroom computer use.

A workshop or informal meeting effectively introduces families to the computer's role in their children's education. These meetings provide opportunities to demonstrate the types and attributes of software and peripherals and the ways children will be using the computer at school. Parents are encouraged to become acquainted with the computer, software, and peripherals through "hands on" activities. Some parents may express particular interest in the computer and will want to learn more about their child's computer activities. Computers are good incentives for getting families involved.

In planning an awareness workshop, keep the atmosphere as informal and non-threatening as possible. The goal is to establish awareness of children's classroom activities and to provide opportunities for hands-on-experiences that may spark some interest and curiosity or alleviate fears about handling the computer. A relaxed friendly atmosphere will make family members comfortable in what may be a new experience and environment.

Assisting with Intervention Activities

Once families know about their children's activities with the computer, they may want to see them using the computer. Parents who are able to come to the classroom may schedule a visit at a time when they can observe their child working individually and as part of a group. Such visits provide opportunities for the teacher to model computer teaching strategies for the parents and for the parents to provide feedback about their child's use of the program.

An after school or evening workshop enables family members who cannot visit the classroom during the day to observe their children at the computer. In addition, this workshop provides siblings the opportunities to observe and interact with each other in unique ways. A foundation for a sense of sibling pride is created as the sibling with disabilities demonstrates skills at the computer.

If possible, have several computers available for the workshop and set up individual stations. Ideally, each family attending would have a computer, but if that is not possible, schedule specific times for each family to attend. During the workshop, the child can demonstrate computer skills to her parents. Family members soon begin to feel more familiar, and hopefully more comfortable, in interacting with their child at the computer. When a teacher uses modeling questions to encourage thinking skills such as: *What would happen if...*, parents are encouraged to ask this type of question when interacting with their children at the computer center.

This level of involvement is often transitional. Some families will return to observe and ultimately participate in classroom computer sessions. If a parent is willing to assist in computer sessions, plan initial activities that parents can take part in comfortably. Because not all families are at the same level at a given time, schedule after school workshops on an on-going basis. Parents who are knowledgeable and willing may assist in organizing and presenting the workshops.

Conducting Computer Intervention

Results are almost always beneficial when parents work directly with their children. Parents provide ideas for making the intervention more enjoyable, challenging, and personal for their particular child. Parents who reach this stage of involvement see the computer as a valuable tool for helping their children gain new skills and reach IEP goals. With computer use, many goals are achieved that have seemed unattainable. Family members who share learning experiences with their children are rewarded by being part of this achievement.

Once adults are comfortable in assisting with computer activities, they may be ready to conduct a session with their child. As parents move to this level of involvement, they need opportunities to familiarize themselves with the computer and available software programs so they feel comfortable. Beginning activities should be kept simple to assure a successful experience. A teacher may help by:

- providing a clearly written explanation of the activity for review prior to the session;
- posting directions near the computer to provide a convenient reference allowing for fewer questions and more independence;
- assembling all materials at the workstation prior to the intervention.

Some family members may be interested in developing their own computer activities for their children. The parent and the teacher should first discuss plans for implementation and their relevance to IEP goals. Once the parent has introduced and conducted the activity, she and the teacher need to discuss the effect of the activity, its success and/or failure. Parents are to be praised and thanked for their efforts, no matter what the degree of success.

At level three, it is assumed that families possess a basic level of computer knowledge. Family Competencies target those skills needed by family members to successfully plan and conduct computer intervention for their children.

Severe Disabilities

Family Participation in Technology Activities

The section on Birth to Three family participation and switch making activities contains information that is often applicable for families of older children with severe and multiple disabilities who have moved into classroom situations. When preschool children function in developmentally younger ways, the curriculum activities designed for birth to three are often appropriate as are our suggestions for families of that population.

Obtaining Information

Children over three with severe disabilities are likely to be served in classroom based programs. Providing families with information about computer technology can often be done in a family meeting. See *The Family Computer Workshop* for ideas on conducting family meetings and workshops. Informing parents that computers are available for their children to use is an initial step in helping parents become aware of computer possibilities for their children. Include some of the following information in a note or newsletter to parents:

1. A computer terminology section that introduces new terms each week/month, and defines common computer terms (i.e., disk, disk drive, computer, monitor, peripherals, switches).
2. A drawing or picture of the computer with labels for the various parts.
3. A simple definition of how a computer works.
4. A description of how you intend to use the computer in your classroom and how the children might benefit.
5. A list and description of the software the children will be using.
6. An invitation to a family meeting or to the classroom to see the computer and observe what the children can do.

Keep families informed throughout the year of software their child is using, ways the computer enables the child to accomplish educational goals, and future applications the computer might hold for their child. Collect and share with families interesting articles about children with disabilities using computers. Send home computer related activities, such as switch use with battery-operated toys and activities which develop scanning skills, which parents can use to reinforce skills which the child needs to use the computer. Fully explain the purpose, both short and long term, of each of the activities. Include an open invitation to visit the classroom and observe or conduct a computer session.

Families appreciate seeing results of their children's efforts. Because parents of children with severe disabilities seldom receive drawings from their children, print out and send home drawings that the children have made using a computer program. Include an explanation of the skills that were required to operate the program.

If the software has record keeping capabilities, send home printouts of the child's progress on a particular program or skill. Observing progress in a child with severe disabilities is difficult, but the computer can document even the slightest amount of progress a child makes. From progress printouts, parents receive positive feedback when their child is making gains.

Assisting with Intervention Activities

Families who eventually assist in computer activities begin by observing children. Many parents who come to the classroom may prefer to observe their child using the computer. If possible, arrange the child's computer time so that parents can see both individual and group use. Videotape sessions with a camcorder and send the tape home if parents work during the day. The tapes will be returned when families know that you will record their child on a regular basis and that they can expect to see their child's progress on that single tape over the year.

When family members come into the classroom, model appropriate computer teaching strategies for them. Encourage them to provide you with feedback regarding their child's use of the software. After they become familiar with the software, encourage parents to talk about the pictures on the monitor or the sounds with their children. Model and encourage parents to use open ended questions and descriptive reinforcement (*"You really did hit the key that made that bear go, didn't you?")* rather than value-judgment reinforcement (*"Good girl!" or "Good job!").*

When family members come to assist, be sure you have an activity scheduled in which they can participate with little frustration. Write a clear explanation of how to operate software programs and mount them on the wall next to the computer, at eye level. Invite family members to return to the classroom anytime. Schedule times when parents are needed to assist with the computer but do not pressure them to come in.

Conducting Computer Intervention

Refer to *Familiy Participation in Technology Activities*, page 32 for applicable suggestions. When parents conduct intervention sessions with children with disabilities, they must know a great deal about the equipment and software. Many adaptations include alternate input, which means attaching and using switches or touch tablets. Therefore, parents who express interest in conducting intervention sessions need training beforehand. Set up special family workshops for these parents so they can familiarize themselves with the equipment and feel confident using it with children.

Observing and interacting with family members during computer sessions can be informative. Parents know their children well and may demonstrate useful teaching strategies. Sharing suggestions and feedback develops a more comprehensive educational approach as well as encourages families to become more involved.

The Family Computer Workshop

Computer technology provides valuable opportunities for the child with disabilities. Including parents in a computer intervention program can be an effective, exciting means of family involvement. Being "involved" does not mean that family members must be present in the classroom; each family's needs and interests will dictate their extent of involvement. However, in all cases, an informal computer workshop effectively introduces parents to the computer's role in their child's education. A workshop offers an opportunity for social interaction with parents who share similar experiences. Parents often help each other face the mystery of technology and solve perplexing problems. They often laugh together!

Setting Up a Computer Workshop

Invitations

Enthusiasm is contagious! Enthusiastic invitations to the workshop arouse parents' curiosity and raise workshop attendance. Be clear and concise in the invitation, indicating reasons parents will enjoy and benefit from the workshop. Create the invitation with *Print Shop Deluxe* (Brøderbund, 1994) and take a "You can do this too! Come and find out how easy it is" approach. Parents should feel that the workshop will be exciting and important, not just another routine family meeting. Along with the invitation, consider sending each family a warm, personal letter signed by yourself, the department head or principal. A personalized invitation from a school official can motivate parents' attendance.

Room Arrangement/Atmosphere

Computer technology is threatening to many family members. They may attend your workshop out of a sense of obligation. Therefore, your goal is to make this workshop as non-threatening and as much fun as possible. Strive for a relaxed, friendly atmosphere where families can learn from and interact with each other.

Choose a room for the workshop that is large enough to allow a comfortable space for the number of workstations you have planned and the number of families you expect to attend. At one end of the room, set up a refreshment table away from the computer stations. Over it, hang a welcome banner prepared by the children using *Kid Pix* and *Print Shop Deluxe*. Nearby, arrange a demonstration station, offering plenty of space for families to stand and observe as you take them through basic computer procedures. At each workstation, provide a comfortable work area by allowing ample table space for equipment, software, peripherals, and handouts.

For the first workshop, plan activities with *Print Shop Deluxe*, a great introduction to computers which offers instant success and fun for every computer novice. Later workshops will involve parents with various software programs and peripherals used by their children. (Refer to *Ideas for Other Workshops* on the next page.)

Workshop Agenda

Offer refreshments and time for families to relax and get to know each other. For a more effective learning environment, keep the tone of the workshop informal and friendly. Plan a warm-up activity or icebreaker, something active or humorous to introduce all participants and to help people feel comfortable with the situation and each other.

Begin the workshop with an explanation of computer technology's role in helping children attain developmental goals. Next, provide an overview of the workshop's objectives and activities. At this time, begin demonstrations of computer use, software, and peripherals. If you have invited the children to the meeting, allow them to do part of the demonstrations. The children and their parents will feel pride and accomplishment.

Designing group experiences for individuals with wide ranges of computer ability and understanding is challenging. If possible, have an assistant at or near each station to help parents get started. Dividing participants according to varying experience or allowing the children to help their parents are all helpful strategies for working with a diverse group.

Divide parents into groups at each station and rotate stations after 10 - 15 minutes. These workstations provide essential hands-on computer time for each small group. Parents who leave the workshop after practicing skills or trying out strategies tend to implement them into day-to-day activities more than those parents who have only been lectured to or who have passively watched others participate.

Once each participant spends sufficient time at each workstation, assemble the entire group for sharing experiences and asking questions. Before closing, ask parents to evaluate the workshop through informal discussions or written questionnaires. Participants' answers will help you modify objectives and activities for future workshops. Among questions you might ask: *How useful were the workshop materials? What new knowledge did you gain in regard to computer intervention? In what way was this a worthwhile experience for you?*

End on a positive note. Thank all participants and, as each family departs, present them with a certificate of attendance. These can be created with *Certificate Maker* (Springboard Educational Software, 1988).

Things To Keep In Mind

1. Provide a friendly atmosphere which encourages family members to explore technology. Use a program such as *Print Shop Deluxe* for the first workshop to insure success for all participants.

2. Provide ample hands-on time. The only way families can understand and appreciate computer use and benefits is to use the computer.
3. Go over terms and definitions and encourage participants to ask questions. Simple, concrete information helps "de-mystify" the computer. Some parents may be afraid of damaging the machine or software. Take time to describe the computer components and operation clearly, and give parents illustrated handouts for reference.
4. Discuss equipment and software care. Give examples and use illustrations.
5. Let family members look at software appropriate both for their child and for themselves. Encourage them to print out a letter, sign, or picture they have created on the computer.
6. Make it easy for families to attend. Arrange for baby-sitting or schedule the workshops during school time to give parents the chance to use the computer alone if they prefer. Other workshops can be scheduled for both parents and children to come and use the equipment together.

Ideas for Other Workshops

Depending on their time, skills, interest in computers and desire to be involved in intervention, families will progress at different rates. Therefore, offer a variety of workshops in an attempt to appeal to everyone. Some ideas:

Initial awareness workshop/family meeting. Introduce the role of technology in your classroom. Explain computer components and jargon. Demonstrate software and allow family members to work at computers stations themselves.

Follow up workshops. Set up computer stations that will introduce family members to various peripheral devices and software programs their children use. Explain how each could be used to meet a child's educational objectives. Let parents experiment with the programs. Children may attend these meetings and demonstrate the equipment and software for their parents.

- **Computer intervention training.** Some families will be eager to learn more about technology so they can assist in their child's intervention program. You will want to give more detailed training to these individuals. Children may attend so that you can model teaching strategies. The family members who attend these sessions may soon be ready to help in your classroom as volunteers.

- **Make-it, take-it workshops.** Make-it, take-it workshops are excellent for harnessing the family power in your program. Since many children will be using switch input to operate the computer, a switch workshop is an ideal way to involve parents in making switches and using them with their children. Home-made switches generally cost less than five dollars each to make, and they perform a variety of functions. Classrooms that utilize switches for the computer center and toys never have too many switches. In addition, broken switches may be repaired by families for little cost. However, the most important contribution a switch workshop provides for your program is the sense of pride and accomplishment family members feel when they have made a device which can provide their children a way of manipulating their environment.

Family Computer Workshops

Computer Workshop #1

During the first workshop two to three computers with printers should be set up in a room. At the beginning of the workshop, explain the parts of the computer and demonstrate the operation of the software at each station. Parents can then work individually or in groups to design signs, cards, calendars and graphics which they can print out and take home.

Work Station 1: **Tools for Making Signs and Cards**
- Color Printer
- Software which provides an opportunity to create and print out something for parents' own use, such as *Print Shop Deluxe*

Work Station 2: **Tools for Making Calendars**
- Color Printer
- Software which provides an opportunity to create and print out calendars for parents' own use, such as *Print Shop Deluxe, KidDesk*

Work Station 3: **Graphics** (this station could be set up with software used by adults or children to create graphics
- Color Printer
- Software which allows family members to create their own graphic and save or print immediately, such as *Print Shop Deluxe, Kid Pix 2, Kid Works 2, EA*Kids Art Center*

Computer Workshop #2

A successful workshop approach involves assembling up to five computer work stations in a room. The content of each station will depend on the population of children served by the program. The following peripherals and software are listed as suggestions for possible work stations.

Work Station 1: **Touch Tablets**
- IntelliKeys, Discover:Kenx, or Key Largo
- Software: *IntelliTalk, Overlay Maker, IntelliPics, Discover:Kenx*

Work Station 2: **Switch**
- Switch Interface
- Switch
- Software which gives parents an opportunity to operate a switch to change a picture or reach a goal: *Switch Intro, Toy Store, Workshop*

Work Station 3: **Mouse Applications**
- Software: *Just Grandma and Me, Stellaluna, Thinkin' Things, Millie's Math House*

Work Station 4: **Problem Solving Activities**
- Software which illustrates how children use the computer to help develop thinking skills: *Logo Plus, Pippi Longstocking, Blocks in Motion*

Work Station 5: **Graphics**
- Color Printer
- TouchWindow
- Software which gives families an opportunity to design a picture and print it out immediately or save it on disk: *Kid Pix, EA*Kids Art Center*

Work stations are numbered and labeled for identification purposes. Work station #1 is presented first. This is followed by a brief explanation and demonstration of sample software programs at each station.

Each parent is then given the option of working individually or in a small group, spending 10-15 minutes at each work station.

Parents already familiar with the computer/classroom environment assist during the workshop by helping other parents boot software and by making them feel more comfortable at the computer station. To ensure a successful workshop, opportunities for instant success are provided using simple, fun-to-learn software programs. Experiences are photographed and videotaped to be shared with children and other parents.

Participating in the workshop provides parents an understanding of computer use with children with disabilities. They can now discuss computer activities with their children at home, reinforcing program goals. By personally using the same software programs as their child, parents are able to comprehend the role of technology in the early childhood curriculum.

Benefits of Family Involvement

Encourage families to participate in whatever level of involvement they feel most comfortable. On any level, when families become active participants in their child's educational program and generalize classroom skills to the home, the child becomes more competent in both environments. By sharing knowledge of the child and his disabilities, families and professionals become partners to provide more appropriate instruction and care for the child. Fewer communication/information gaps exist between home and school, and active family participation allows children to demonstrate accomplishments outside the classroom that might otherwise go unnoticed.

Through Parents' Eyes: Technology Issues for Young Children

"To tell me my child will never do anything is the biggest challenge of my life." This statement by Jane expresses the determination of all four parents who participated on the opening panel during the early childhood technology ACTT VI conference in 1995 held at Western Illinois University, Macomb, Illinois. Participants at the conference had the pleasure of hearing four parents speak about their children and issues related to using technology at home and school. Along with Jane, the other three speakers were Lisa, Cathy, and Tracey. Their children ranged in age from 4 years to 11 years, and exhibit a variety of disabilities. Although each one has unique abilities, they all have some common experiences when it comes to technology. The topics which were addressed included present curriculum applications, IEP writing, benefits, obstacles and future goals.

During the discussion it was obvious that technology may be one small way to meet some challenges. Each panel member discussed specific technology applications used by their child. Lisa's daughter, Erika, used the Macintosh computer for writing assignments in 3rd grade. Erika wanted the other children to be able to read what she was writing. She did not feel her own handwriting was acceptable. So the computer gave her a product that she could be proud of.

Cathy's son, Jeff, used a portable communication device, the SpeakEasy, to communicate with others. He took his device to Hardee's to order food. At age seven, Jeff had an opportunity to interact with his environment and all of the children at school through this technology. Jane's son, Adam, used a Macintosh computer in kindergarten to help with academic skills and to prepare him for later applications in writing. Jane also spoke of the role Adam's motorized wheelchair played in promoting his socialization and independence.

Tracey' four sons, Shawn, Troy, Joshua and Kip, used a variety of technology, including TouchTalker, Liberators, and computers, at home and school. Troy used his TouchTalker to communicate with teachers and classmates, and, as his mother said, "to negotiate social situations." All of her children used technology for literacy skills. The augmentative communication devices were programmed with words which described summer camp and other events. When combined with a picture album, these devices enabled each boy to talk to others about these special days. Joshua also used technology to help learn sight words. With his disability, rote learning is particularly effective. Technology provided a way for him to independently hear the printed word spoken and to increase his reading skills and concept development.

When the parents were asked to specifically discuss the benefits of technology for their children, there was some uniqueness, as well as similarities. Common benefits included independence, equal participation with peers, increased communication, and greater sense of self-esteem. Other benefits included being able to process steps in learning, increased academic skills and concept development, and decreased behavior problems.

Technology was written into some of the children's IEP's with writing skill objectives given as examples. All of the parents discussed the importance of getting technology written into the IEP and each one expressed plans for doing so in the near future.

Panel members identified obstacles they encountered. Common obstacles included funding for equipment for home or school, accessibility of equipment, and lack of training by school staff. The bulkiness of the communication devices was another obstacle mentioned by one mother.

Finally, the parents spoke of technology's role in their children's futures. For Erika the computer will continue to provide her with a means of independence and something she can be proud of. For Jeff, the technology will continue to provide a means of interaction with others and a way to explore opportunities. Since Adam wants to be a doctor, technology will be an important tool for his written communication. For Shawn, Troy, Joshua, and Kip technology is the key to written and social skills and a tool for learning and leisure. All of these parents have met the challenge of helping their children achieve their highest potential. The road ahead of them may be long, but their commitment to technology will ensure that the path is as smooth as possible for their children.

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Chapter Four

Technology Assessment

Assessing Young Children's Technology Needs

Using assistive technology can make a great difference to children with disabilities. Not only does it allow them to control and interact with their environment, it also provides opportunities for learning, playing, creating, and communicating.

The value of assistive technology was recognized by Congress and the passage and reauthorization of IDEA (1997 Amendments to IDEA, P.L. 105-17). Assistive technology devices and services are now part of the law. However, simply providing a child with a computer and adaptive peripherals is not the answer. In order to determine the most appropriate and effective technology applications for a specific youngster, a technology assessment must be carried out as part of a comprehensive assessment.

Project TTAP: Technology Team Assessment Process has developed a model which guides early intervention personnel and families in conducting technology assessments for young children with moderate to severe disabilities. A complete description of the TTAP assessment procedures and a copy of TTAP's assessment forms are available in the manual, *The Technology Team Assessment Process* (Macomb Projects, 1992).

The technology assessment process designed by Project TTAP has six purposes:

1. Determine whether technology (computer or switches and toys) provides suitable learning materials for the child.
2. Determine appropriate hardware, software, adaptations and activities for the child.
3. Determine suitable positioning for the child.
4. Determine suitable placement of equipment.
5. Provide information to the child's family and the child support team.
6. Provide a set of recommendations on hardware, software, adaptations, and curriculum activities for the child.

The TTAP process is a team approach which helps ensure that children from birth to eight with moderate to severe disabilities receive a thorough technology team assessment and follow-up consultation. A team may be established by a school district, a special education cooperative, regional programs, a State Department, an Assistive Technology Project, or other entities to conduct technology assessments for families and children.

Technology Assessment Team Members

The Core Team

The technology assessment team is composed of two distinct clusters, the Core team and the Child Support team. The Core team generally remains stable and is responsible for conducting technology assessments and writing the final evaluation report. It includes, at minimum, an early childhood intervention expert, a technology/computer expert and a physical therapist or occupational therapist. A communication specialist and a psychologist may also be members of the team.

If you are setting up a technology assessment team, include a technology/computer specialist who knows how to set up and run a variety of electronic equipment including switches, computers, peripherals, and software. This person will assist the team in determining appropriate materials, software, and equipment needed for the assessment. Also, include an early intervention expert who may be a child development specialist, a psychologist, or an administrator with early intervention experience who knows about young children with disabilities and their families and who also knows about suitable curriculum activities for young children.

A physical therapist and an occupational therapist provide essential input on correct positioning and switch placement. A communication specialist provides information about appropriate communication uses of various technology applications. That includes communication devices useful for the child's preferred method or level of communication, as well as software. Sometimes members of the Core team also assist family members in acquiring various technology competencies if training resources are not available.

The Child Support Team

The Child Support team is unique to each child assessed, so membership will vary depending on the individual child's disabilities. Every Child Support assessment team includes the child's family. Parents provide insight into the child's abilities and also help to establish appropriate goals for development. Early intervention personnel, including teachers, child development specialists, parent infant educators, or early childhood program administrators, are also considered integral to the effective functioning of the Child Support team. These individuals can provide input on the child's current cognitive and motor skills and assist in the development of educational goals.

In addition, the child's disabilities may dictate the need for other professionals to serve as support team members. The child's own physical and occupational therapists and communication specialists provide insight on his positioning, activities of daily living, and communication abilities. In some cases, a school psychologist can assist in the assessment process by providing suggestions about the child's emotional and cognitive development together with goal setting. Through the combined efforts of all team members, a comprehensive assessment of the child's abilities can be performed in an efficient, comfortable team setting.

Technology Assessment Procedures

The assessment is a process which begins with a referral and continues through follow-up services. Project TTAP has established procedures for the process before, during and after the assessment.

Procedures Prior to Assessment

Part of the pre-assessment process is gathering background information on the child. This includes completion by the family of a form developed by Project TTAP which provides personal data, diagnosis and medical information, the reason for the assessment, information on the child's behaviors, the child's physical status, communication abilities, seating requirements, and previous experience with switch-operated toys and computer equipment. In addition to this form, TTAP staff request copies of pertinent information, such as evaluation reports and the IEP and IFSP, out of the child's files. Also the family and/or teacher is asked to provide a short videotape which shows the child's normal activities either at home or at school or both places, if possible. Viewing the videotape and reviewing the background information is an important part of the assessment planning process.

Once all of the needed information is received, team members may meet to discuss goals and possible agenda for the assessment. Plans on software to be used and any needed equipment adaptations are decided upon at this time. Further changes in the plans may be made on the day of the assessment after discussion with other team members.

For the assessment, a room is chosen which will have ample space for equipment, adaptive seating, conference table and chairs, and, if possible, a play area. Videotape equipment is set up in a position with minimal distractions for the child. Videotape is an essential means of record keeping for team members. A review of the tape later may reveal behaviors or abilities not apparent during actual observation of the assessment. Videotape is also a valuable record from which to write an accurate evaluation report. Conference area is important for meeting with team members before the assessment, as well as at the end of the day's session. Play area is essential, if not directly in the same room as the assessment, then within the building, so that the child can take breaks and return to the task within a short period of time. The younger the child is the more breaks may be needed.

Assessment Day Arrives

So all the arrangements are made and the assessment day finally arrives! After the child is introduced to all team members, and made comfortable in the new surroundings, she may be taken for a walk around the building or to the play area to relax. At this time, the team members meet to discuss the goals for the assessment and to plan the agenda for the session. The meeting time is limited to 20 minutes so that the child does not get too tired before the actual assessment begins.

The first steps taken during the assessment concern the child's positioning and the placement of equipment. Depending on the child and the amount of adaptations needed, decisions on these factors may take a long time. Child positioning and equipment placement are considerations which are constantly re-assessed during the session as different switches or other adaptive devices are used with the child.

Decisions on what software to use during the assessment are based on a number of factors, including input method, the child's cognitive level, and the child's interests. For an example, we will use the case of four-year-old Steven whose mother and teacher say that he likes music and different sounds, but they are not sure whether he knows he is starting his tape recorder when he presses his switch. He is physically limited in his ability to use his hands, and his only means of communication is an inconsistent utterance or eye gaze.

Where to Begin

Initially our main goal is to assess Steven's understanding of causality concepts through simple programs which react to any switch press. Therefore, we start with a program, such as *Switch Intro* (Don Johnston). One part of this program is "Make It Sound" which focuses on sounds and related pictures on the monitor. After positioning and placement of the switch, we observe Steven's actions. We look first at his interest in making an effort to reach toward the switch, and his physical ability to press on it. When he does activate the switch, we observe his reactions, any facial or verbal responses to the sounds, and his visual attending to the monitor. If he makes no attempt to activate the switch, physical assistance is provided once or twice to get him started. At this point, a determination may be made that the placement or type of switch needs to be changed. These are variables which are assessed on an ongoing basis throughout the session.

Let's assume Steven is able to press his switch and does so randomly to make the sounds change in the program. Then the next step would be to assess his ability to press the switch at an appropriate time. This skill is needed in order to advance to functional use of communication through scanning. It also indicates to us that he is able to control his movements in order to get the desired result. *Press to Play - Animals* (Johnston, 1994) is one program which can be used to test appropriate switch pressing or train a child to develop this skill. This is a simple way to test or teach appropriate switch pressing skills.

If it is determined that Steven does have an understanding of waiting and pressing his switch at a specific time. Then the next step is to test more specifically his ability to attend to the monitor and visually track an object across the screen. A simple program which can be used to assess this skill is the "Willy the Worm" portion of *Switch Intro*. This program can be used to assess the child's ability to visually track the object and to press his switch appropriately. The requirement of starting the object movement with a switch press each time is similar to the action which is needed to control a scanning array, one press to start the scanning, another press to stop at the desired word or letter. With an auditory beep added to the initial switch press, this program can be used to assess beginning auditory scanning, as well as visual scanning skills.

If it is determined that Steven has the ability to do these beginning scanning skills, then the next step is to assess his intentional use of progressively more difficult scans. We may use *aMAZEing Ways* (Johnston, 1994) which contains several switch activities with mazes. We would continue to assess his scanning skills either until Steven tires or the team has a good evaluation of his abilities.

For some children other methods of input, such as a touch tablet or adapted mouse, may be assessed during the session. If a child has enough hand control to use direct select method of input, the Key Largo or IntelliKeys may be an option. Assessment of these devices should begin with simple software which is activated by a press anywhere on the surface of the device. This way the team can assess the child's physical ability to use the device, before progressing to different levels of touch tablet use. When team members feel confident in their assessment of input method and software applications, the assessment is ended.

At the end of the assessment, team members discuss preliminary recommendations with family and other support team members. This is a good opportunity to answer any questions about equipment, adaptations or curriculum applications for the child.

After the Assessment

Team members review the assessment videotape, summarize observations, and discuss recommendations as part of the post assessment process. A thorough assessment report is written which includes information on the purpose of the assessment, participants, equipment, and software used, activity summaries, and recommendations on equipment, software, adaptations, and activities. The assessment report and recommendations are useful to the child's family and school system, since they can be used as a basis for IEPs and for funding applications.

Summary

To effectively use technology curriculum applications with a young child, an assessment must be conducted in which family members, therapists, teachers and assistants, and other support personnel make decisions as a team concerning technology considerations for the child. A technology assessment determines a child's abilities and interests and matches them with the hardware, software, and peripherals appropriate for that child. Only then can technology be used effectively as a tool to help children meet their individualized goals.

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Chapter Five

Switches

Why a Switch?

A switch is a simple device used to control computer input when a mouse or keyboard cannot be accessed. Switches are also used as alternative input mechanisms with battery-operated toys. Children with physical or cognitive limitations are given the ability to respond to environmental stimuli through switch use. Using a battery-operated toy activated by a switch allows children with severe disabilities opportunities to control external events and to play with others. Because they help children gain a sense of predictability, normality, and an understanding of causality, switches provide excellent preparation for future applications of environmental control and communication.

Besides offering a beginning method of input, the switch may also serve as a tool for communication and other functions throughout a child's life. The child may need to learn how to indicate needs or wants by using a switch to scan across an array of choices. Children cannot be expected to know how to scan pictures or words with a switch without proper training. Through use of selected software a progression of switch skills can be learned by a child. After achieving causality, the child will learn that there is an appropriate time to press the switch, and that specific switch pressing will result in communication. By starting with simple software programs, the child can master skills needed to communicate with a device, such as the Liberator.

Many software programs have been developed to reinforce these skills. In addition simple activities can be designed to help reinforce skills. Switch programs, such as *Switch Intro, Hit 'n Time, aMAZEing Ways*, and *Toy Store* by Jokus are good examples. For use with Apple computers, Don Johnston's "Make It Series" and R.J. Cooper's programs are good choices for progressive switch use.

Switch Selection

Because the needs and abilities of children with disabilities are so diverse, matching the type of switch to the child is critical for the child to successfully use it. Proper placement of the switch and positioning of the child are two important factors for optimal child response. The child's most reliable, comfortable, and stable body position must be assessed. The child's energies should be focused on operating the switch and responding to the stimuli, not on maintaining the "proper" body position.

After the most reliable body position is determined, various types of switches can be evaluated. The tread, ribbon, and pillow are some of the most common types of switches with prices ranging from $5 to $200. The various types of switches discussed below can be customized to meet the needs of a particular child.

The Tread Switch: A tread switch is pressure operated. Pressure can be applied with the press of a finger, hand, head, or foot. When enough pressure or force is applied to the top of the switch, a connection will be made. As long as the pressure is applied, the circuit will remain completed and the connected device will continue to operate. When the pressure stops, the circuit will be broken and the connected device will be turned off. A tread switch can be made of durable materials such as wood and plexiglass and has a reinforcing clicking sound so the child knows when the switch has been pressed. Macomb Projects disseminates a videotape and manual, *Constructing a Battery Interrupter and a Tread Switch* (Macomb Projects, 1987) that demonstrates how to make a simple, inexpensive tread switch. A few of the most popular commercial tread switches are the Jellybean switch and Big Red Switch from Ablenet, and the BASS Switches from Don Johnston, Inc.

The Pillow Switch: Another pressure activated switch is the pillow switch. This soft, sensitive switch can be activated by a slight press of a hand, finger, head, or foot. The cover on the pillow can be changed to add tactile or visual stimuli. Schematics for making a pillow switch are contained *in A Switch To Turn Kids On* (Macomb Projects, 1993). Commercial pillow switches, such as the Red Switch from TASH, are also available.

The Ribbon Switch: The ribbon switch is a long, flexible band that can be activated by a sweeping motion of the hand or a direct grasp, pull, or push against it. A homemade ribbon switch can be mounted in wood blocks to provide stability or can be covered with tactilely or visually stimulating materials. A commercial version of the ribbon type switch is the Ultimate Switch from Toys for Special Children.

Encouraging independent learning is the goal of any switch activity. Independent learning can be enhanced using switches coupled with software programs and/or modified toys to foster the child's realization that he has impact on or control over his environment.

Summary

Whatever input method is used, technology can be a tool for increasing attending and communication skills and helping develop a variety of early childhood skills. Young children benefit from the consistent use of the equipment as a tool. Computers provide children with the environment for acquiring early concepts and gaining confidence in communication and cognitive skills. By providing young children the opportunity to perform at their full potential now through simple input methods, such as the switch, they become prepared for future use of the computer as a tool.

Switch Applications

Switch Application at the Computer Center

Activities can be designed to reinforce beginning switch skills for children who have severe disabilities and who will eventually be using a scanning mode for communication. ACTT staff defined six levels of switch progression to prepare a child for scanning (See Levels of Switch Progression in the Appendix). Levels range from establishing causality with simple switch input to communicating through pictures or words. Through the use of *Discover:Kenx* an adaptive interface, software can be customized according to different levels of switch use. *Millie's Math House* Ke:nx setups were designed by ACTT staff to reinforce various switch skills. One set-up to reinforce causality or the first level of switch progression involves the use of four switches, Ke:nx, and the Multiple Switch Box. The four switches are set up to activate the cow, dog, duck, and pig in "Here Comes Bing & Boing." This portion of the program presents the child with several animal blocks. The child can move the mouse to one of the blocks and click to hear that animal sound, or a game can be played in which the child is required to click one of the animals to complete a specific pattern. To simplify the program, a Ke:nx setup can be made so that a switch press takes the place of the mouse click. The setup is designed so that a press on one of the four switches produces an animal sound. At the simplest level the child is learning that he can control the sound made by a desired animal by pressing one of the switches. With other setups the child will eventually learn to press a switch at an appropriate time to get a desired result.

At a higher level of switch progression, the child may be required to press the switch to start action on the monitor, then press again to get a desired result. An example of this type of switch use is a Ke:nx setup with "Build a Bug" portion of *Millie's Math House*. In this part of the program the child can build a bug by selecting bug parts and numbers to indicate their quantity by selecting the items with a mouse click. For a child who needs switch input, a Ke:nx set up can be made so that one switch press starts a scan of the bug parts and numbers and a second press activates the selection. The child creates her own bug on the screen by pressing her switch, watching the vertical scan of the bug parts, then pressing the switch again when the scan is at the desired item. She presses her switch to start the scan again and waits until her desired number is highlighted, then presses to select that number. These steps for making a bug help teach important switch pressing skills needed for more sophisticated applications later, such as word processing or communication.

A program such as *Millie's Math House* can also be adapted for touch tablet use through Ke:nx. If a child is unable to operate the mouse, overlays can be made for the Key Largo so that a press on a picture replaces the mouse movement and click. Also the program can be simplified for young children by designing overlays with a limited number of choices. One example is an overlay for the "Little, Middle, and Big" portion of the program. In this activity, three characters, Little, Middle, and Big are in need of shoes. The child is presented with nine pair of shoes from which to choose a pair to fit each character. To simplify the program and limit the number of choices, a Ke:nx setup and overlay can be made. One example is an overlay in which only Little and little shoes are presented to the child. A second and third overlay can be made for Middle and Big. By customizing these overlays a branching function can be included so that the interventionist can move easily from one overlay to the next. Through the use of Ke:nx, activities can be customized for any software program.

Switch Adaptations

A Customized Switch Holder: One Solution to Switch Placement Problems

A switch may be the only means of interacting with the environment. This small piece of equipment plays a very important role in the child's life. To insure that the child is able to respond optimally with the switch, several factors need to be taken into consideration. The type of switch to be used will need to be determined according to the child's abilities and interests. Also the child's position plays a major role in his success in accessing a toy or the computer. And last, but not least, is the placement of the switch. Placement is one factor which is often overlooked, or not emphasized enough in an overall view of the child's use of the technology.

Switch placement may be difficult to determine for children with severe disabilities. Many children access the computer while positioned in their wheelchair. While the monitor is placed at eye level, the child must concentrate on activating a switch. Even though a switch can be secured to a wheelchair in a variety of different ways to allow switch access for various body movements (e.g. head, leg, or foot) a majority of children use their arms, hands, or fingers for switch access. Switch mounts are available commercially for head or chin positioning, which can be attached easily to the child's wheelchair. Various materials are available for securing a switch flat on a table or wheelchair tray. Dycem, suction cups, duct tape or even masking tape can serve the purpose in securing a switch temporarily on a surface for the child. However, children who exert a lot of pressure may still move a switch slightly out of place with these mterials. A more secure placement is then needed to hold the switch in a stable and reliable position.

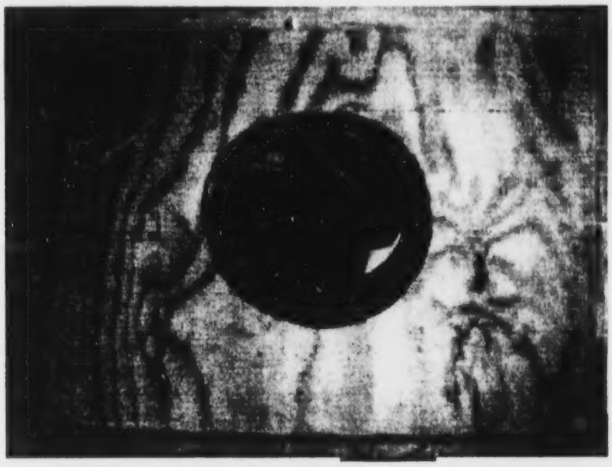
A customized switch holder, such as the one desinged by ACTT may be the solution. The design is an adaptation of a homemade switch holder used by an ACTT site during a follow-up visit by ACTT staff members. Made out of durable material, this holder not only secures the switch in place, but can also serve as an arm rest for the child who has difficulty lifting his hand onto and off of the switch. It provides an elevated surface so only slight movement is needed to activate the switch. The holder can also provide a surface that can be identified tactility by a child with visual impairment. When he feels the familiar switch holder and his switch, he knows that it is time for computer activities.

Switch placement is also an important consideration for children with mild disabilities who perform developmentally in the birth to three age range. A switch may be the best method of input to the computer; however, children who have the physical ability to handle the equipment tend to become distracted with moving the switch and switch cords. The customized holder provides space underneath for hiding cords and provides a stable position for the switch, eliminating the distraction of playing with the tape, picking up the switch or sliding it across the tray or table. The secure switch placement allows the child to concentrate on the child's reaction to the toy or software.

With a little help from a carpenter or handyman, an inexpensive switch holder can be made from scrap plywood. The holder can be designed to fit a tread switch of any shape or size. The customized holder can be placed on any table or wheelchair tray, and securely attached with clamps, if needed.

This secure placement allows the child to concentrate on the activity and the interventionist to concentrate on the child's reactions to the toy or software.

Making a Customized Switch Holder for a Large Round Switch



Front of Switch Holder

Materials

Scrap 3/4" plywood (preferably AC grade)
Circular saw
Saber saw
Router with rabbeting and rounding bit
Sand paper
Varnish or paint
Large round switch, such as Big Red Switch

Procedures

1. Study the application of the switch. Determine how to work the wood to adapt it to the switch.
2. Cut the 3/4" plywood to fit securely on top of the child's wheelchair tray.
3. After determining the correct placement of the switch, trace the switch onto the plywood, leaving a 3/8" lip on the inside.
4. With the saber saw cut the traced circle. Using the router with the rabbet bit, make a ledge to hold the switch so that it will be recessed. Rout around the switch's shape. Remove the unnecessary wood with the router.
5. Place the switch into the hole. Check for adjustments. Remove the switch and make final adjustments.
6. Rout an additional straight line underneath the plywood so the switch's cord can pass through. For a smooth outer edge, use the router and rounding bit around the outside edge of the holder.
7. Sand the holder till smooth. Paint or varnish the holder.

Application

Insert the switch into the holder. Place on child's wheelchair tray. Use a portable clamp to secure the switch holder if necessary. Plug the switch interface box into the ADB port of the computer and the switch into the switch interface box. The switch is now ready to use.

Variations

Any type of switch may be used. Just make the cuts to fit the switch. When painting or varnishing the holder, be creative and include the child's name, graphics, and/or a favorite sticker.

Summary

An important consideration when using switches with young children is secure placement of the switch on a wheelchair tray or table. A customized switch holder can provide a suitable placement for children with severe physical disabilities, as well as those with mild developmental delays. Made out of inexpensive scrap plywood, the holder can be designed to fit a switch of any shape or size. Applications are not limited to young children or certain disabilities. A person of any age who uses a switch and needs secure placement on a wheelchair tray or table could benefit from a customized switch holder.

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Chapter Six

A Potpourri of Activities

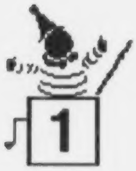
Introduction to Activities

The following potpourri of activities, listed in alphabetical order, are based on children's interests and experiences. Use the following examples as models. Change and add to these activities to meet the interests of the children in your classroom. Design the activities by incorporating art, community environment, family, food, or story time. By integrating these experiences in children's work and play, concepts can be built from their own natural environment. Children become investigators, building deeper understandings of the world around them.

Curriculum Icons

Learning Cycle Levels

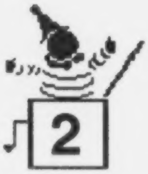
Each curriculum activity is written according to one of four suggested skill levels which are based on Bredekamp and Rosegrant's (1986) *Modes of Learning and Teaching.* These levels serve as guidelines for selecting appropriate technology curriculum activities based on a teacher or family member's observations, children can be identified as performing at one of these skill levels. Computer activities and interaction can be planned accordingly. These skill levels provide a framework for planning, implementing, and evaluating technology curriculum applications for young children. The skill levels follow:



Clown 1. *Awareness*: Young children attend to their environment as they begin to acquire interest in people and surroundings. They learn that there are consequences to their actions. Their time is spent perceiving and experiencing new things.

For technology activities, this means that children attend to what's happening on the monitor and are interested in the graphics and/or sounds in a program. They may begin to understand that they can make a picture animate as they press the switch, touch tablet, mouse, or a key on the keyboard. Skills which may be observed include:

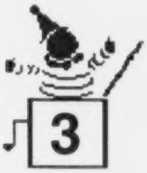
1. Attend to visual effects on monitor.
2. Attend to auditory responses from computer.
3. Understand how to press a switch, TouchWindow, or other input device to cause the action or sounds on the screen.



Clown 2. *Exploration*: Children are observant and creative. They begin to make choices and figure out components.

During technology activities, children may make choices between options within a program or choose between two switches to get different results in a program (change of picture or animation). Children will explore software at this level and experiment with different parts of a program. Skills which may be observed include:

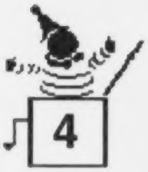
1. Choose program to use.
2. Choose between two switches to press or two or more areas on an overlay.
3. Press TouchWindow or mouse to explore characters and objects in story programs, such as *Just Grandma and Me*.
4. Press switch, TouchWindow, or mouse to turn page in computer story.



Clown 3. *Inquiry*: Children begin to examine and investigate their environment. They are able to focus on specific aspects of their surroundings and generalize what they have learned. Children can compare things in their mind and relate people, objects, and experiences to something learned previously. They begin to adjust to the norm and conventional rule systems.

At the computer children initiate actions and begin to make more intentional choices with a program. They are able to generalize learning from off-computer activities to computer activities. Skills which may be observed include:

1. Explore a program in an effort to figure out how it works.
2. Press hot spots not previously explored.
3. Press appropriate hot spot (or press switch at appropriate time) in response to program requirements.
4. Explain how program works to another child or to adult.
5. Answer questions about the software program verbally or with communication device.
6. Relate the software to another program the child has used.
7. Relate off-computer materials or activity to content of computer program.



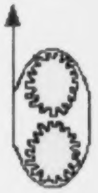
Clown 4. *Utilization*: Children are able to apply learning to new situations. They are able to use and represent learning in many ways.

Children can apply problem solving skills during computer activities. They can think for themselves and communicate in meaningful ways. Skills which may be observed include:

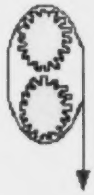
1. Figure out how to use a program not previously seen.
2. Construct own part to a program (such as *Blocks in Motion*).
3. Make own activity out of content in software program.
4. Customize computer screens by adding own graphics and sounds (such as *HyperStudio*).
5. Use an input method (such as switch or touch tablet) to communicate needs and desires.

Other Icons

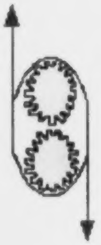
Although each curriculum activity is designed for one learning cycle level, some activities may include ideas for making the activity more complex (Gear Up), simpler (Gear Down), or both (Gear Up or Down). An activity may also include ideas for using the software with a group of children (Group Activity).



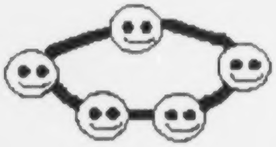
Gear Up



Gear Down



Gear Up or Down



Group Activity

Adult Technology Levels

A variety of skills are involved in using technology with young children. These levels were created as a guide to knowing what technology skills are needed for a particular activity. A fully competent computer user can choose any activity to use. However, a less experienced user who does not feel comfortable adapting programs or using an alternate input device may find these levels helpful in choosing an activity suited to their computer competency level.

Level 1

1. Open a program from the hard drive or a CD-ROM..
2. Use program with mouse input.

Level 2

1. Attach a TouchWindow to the computer.
2. Calibrate the TouchWindow in the Control Panel
3. Use the program with the TouchWindow or a mouse.

Level 3

1. Attach a switch input box to the computer.
2. Select different options within the program, such as switch access, scan speed and skill
3. Use program with switch level.

Level 4

1. Attach *Discover:Kenx* or *IntelliKeys* to the computer.
2. Open a commercial set-up to use with the device.
3. Use the device with the program, making any needed adjustments in the set-up.

Level 5

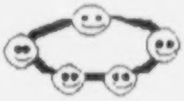
1. Attach *Discover:Kenx* or *IntelliKeys* to the computer.
2. Create a customized set-up for use with the device and a program.
3. Open the customized set-up.
4. Use the program with the device, making any needed adjustments in the set-up.

Level 6

1. Create customized computer program, using scanned pictures, photos, and recorded sounds with authoring software, such as *HyperStudio*
2. Open the program; use with a mouse, TouchWindow or other alternate input device.

A Villa Villakulla Day

Stories of *Pippi Longstocking* by Astrid Lindgren can provide young children an opportunity for creative play within any classroom. Pippi is a young girl who wears her bright red hair in two stiff braids. She can be very mischievous. In the CD-ROM program of *Pippi*, there are three stories. Pippi and her pets, (Mister Nilsson, a monkey and a horse) make new friends with the neighbor children, Tommy and Annika. The other stories tell how Pippi makes pancakes for her friends and how two tramps attempt to steal Pippi's gold coins. Children can have fun making pancakes in Villa Villakulla, painting gold coins, or having Mister Nilsson join them for snack time.



Materials

Computer with color monitor and CD-ROM drive
Pippi (Ahead Media AB) - Don Johnston Inc.
Optional: Switch interface and switch, external speaker

Ahead of Time

Create a Villa Villakulla Village in the classroom. Enclose desks, and/or tables with cardboard boxes to form a circle. Create a banner which reads, "Villa Villakulla" or have the children color a sign with the name "Villa Villakulla Village." Designate part of the cardboard boxes as an area on which the children can color or draw as desired. On a desktop, create a simple stove top. Cover the desk with paper and draw stove burners with a timer and controls. Place cooking utensils with plastic eggs on the stove.

Boot the program *Pippi* on the computer.

Computer Activity

For story time, gather the children to the computer center. Select the Pippi story about pancakes from the attic screen. Encourage the children to assist turning the pages of the story (either with a switch or mouse). During the story, ask questions such as: *What happens to his hair? What Pippi did with the spoon? What did Mr. Nilsson do*?

After the story allow the children to freely explore the *Pippi* program during their computer time.

Related Activities

Art Center

Make cardboard pancakes using white paper and cardboard circles approximately 6" in diameter - 2 for each child, and color markers. On each cardboard circle print the child's name or have the children print their own names. Cut a circle approximately 12" round from white paper. Cut four slots in the circle to form a bowl.

At the art center, children can color their pancakes and bowls. Place butter and syrup on the table. Ask the children what color syrup and butter is. See if they can select a marker the same color as syrup or butter to color their pancakes. After the children have colored their bowls, staple the paper together to form a bowl shape.

Snack Time

Assist children in making the pancake batter. Children can help stir the batter. Cook the pancakes in an electric frying pan. Explain to the children how to cook pancakes. Look for the bubbles on the top of the pancakes. With some practice, try flipping the pancakes when turning them. When the pancakes are done, have children hold their plates with two hands. With a spatula, flip a pancake to each child's plate. Expect to lose a few pancakes during this snack time.

Music Time

During music time sing the *Pancake Rap Song* with the children.

Pancake Rap Song
by Jean Davenport

Let's make pancakes
Put in the flour
Pour in the milk
(Hope it's not sour!)
Careful with the egg
Don't let it roll
Now crack it, crack it,
Crack it on the bowl.

Get a big spoon
And stir till it's smooth
Stir it, stir it
Stir it til it's smooth

Pour some in the fry pan
Cook it till it bubbles
Then you gotta flip it
Or you've got trouble!
Cook it on the other side
Then flip it on your plate
Put on butter and syrup
I just can't wait!

Pancakes, pancakes
Get'em while they're hot
Fill up my plate
Cause I like 'em a lot!

Gross Motor Activity

Play a game catching the paper pancake. Ask the children to get their bowls and pancakes and stand in a designated area of the classroom. Collect all of the pancakes from the children. Have the children stand in a line and hold their plates with two hands. The teacher or a child takes a spatula and randomly flips the cardboard pancakes in the air. Encourage the children, "See if you can catch a pancake!" After all of the pancakes are flipped have the children form a circle. Let the children look and see whose pancake they caught. See if they can guess. Hold up a pancake and ask, "*Who does this belong to?*" After a child responds correctly, give the pancake to the owner. Continue doing this until all the children have their own pancakes. Then designate a child to be the "Flipper" of pancakes. Set boundaries before the game. Some children might find this hard to do. Encourage children to flip one pancake at a time.

Collect the children's pancakes. Randomly place the pancakes on the floor. Then ask the children to *"Find the pancake with your name on it."* After the children have found their pancakes, take them back to the carpet and see if the children correctly selected their pancakes.

Other Activities

Use a switch with the *Pippi* program to encourage development of scanning skills. Select switch input and set the scanning speed. Begin with one of the three stories since there are only a few choices for scanning, Turn the Page, Repeat the Page, Go Back to the Beginning, or Select a Different Page, on each screen. After a child is familiar with the scanning, select a room of the house and a number of choices for scanning will be presented at the bottom of the screen. A switch press will activate the chosen object in the room or will exit the room or program. In this way a child can explore Pippi's house independently with a switch.

Curriculum Integration Ideas

Cooking/Snacks

- Make batter for cookies
- Compare the batter to Pippi's pancake batter
- Feed a pretend Mr. Nielsen or other pet

Emergent Literacy

- *Pippi Longstocking* book (Lindgren, A.)

Expressive Arts

- Make chef's hats
- Play in the Villa Villakulla house - making pancakes, flipping and catching them
- Make paper coins and paint them gold
- Pretend to be the characters in the stories

Math

- Count the number of pancakes made by the children
- Chart children's preferences for syrup, butter, or jelly
- Group the gold coins according to size and shininess
- Play store and use the gold coins as money

Summary

Through the use of one software program, *Pippi*, children can enter into a number of interactive learning experiences. The many activities in the software itself can be used to spur further related activities in many curricular areas.

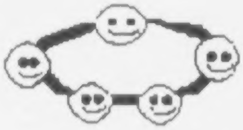
An Interactive Field Trip

Field trips are an important experience for children in an early childhood classroom. These trips may be planned around topics discussed in the classroom or around seasonal themes. The local community may have an industry or a historical feature that would be interesting for a field trip. Places to visit may include: YMCA, park, library, post office, bakery, fire station, green house, bowling alley, newspaper office, zoo, or a tall building. Activities and discussions about the field trip may enhance language and cognitive skills in young children.

Children can retell their field trip experiences through art work, written expression, drama, and storytelling. *HyperStudio* by Roger Wagner, an authoring program, can then be used to incorporate the children's products into a unique story to be retold on the computer. The field trip experiences come alive on the screen as familiar pictures, people, artwork, and voices appear in the class' story. By helping develop this computer story children gain skills in sequencing, communication, identification, and social interaction as well as the pride from seeing their own art work and story on the computer.

By capturing this story on disk, it can then be viewed at family nights and open houses and shared with other early childhood classrooms. Many activities can be developed around the children's computer story. The children can relive their field trip during computer time. Copies of each child's story can be shared at home and in the reading center.

Adapting *HyperStudio* with a switch, TouchWindow, or other touch tablet will provide an added means of achieving a variety of skills in an inclusive setting.



Materials

- Computer with a color monitor
- *HyperStudio* (Roger Wagner)
- Microphone - compatible for the computer
- Color printer
- Camera and film
- Color Flatbed Scanner (optional)

Ahead of Time

Schedule the field trip, transportation, and additional assistance. Obtain permission slips and gather any materials needed. Prepare activities to introduce the field trip for the classroom. For example, ask the children to predict what they would see on the field trip and review rules for taking field trips (stay with your buddy, ABC's "always be careful," and 1, 2, 3, "to yourself, others, and things"). Take a camera to capture pictures of sites visited and photographs of each child.

After the field trip encourage the children to talk about what they saw during circle time. Ask, what were their favorite parts or what did it look like? For sequencing, ask questions such as: "*What came first?*" or "*What came next?*" This allows the children to be reminded of what they did and the experiences they had. Write comments on large tablets.

Provide opportunities for the children to draw pictures of their field trip experience. These drawings can then be scanned and saved for future use in *HyperStudio*.

Computer Activity

At the computer center, with each child taking turns, have children draw pictures of their experiences using the drawing program in *HyperStudio*. Save each picture to disk. While some children are at the computer center drawing, other children can use markers to draw pictures of what they saw. Ask leading questions that facilitate the children's involvement with recalling the trip, such as; "*What was your favorite part of the field trip?*" or "*What did it look like?*" Extend discussion among peers about what they liked.

With a facilitator at the computer using *HyperStudio* Sound Shop, encourage the children to retell their experiences. Record their voices and save them to disk. Use these voices to describe what was in their picture and/or their experiences.

During teacher prep time, combine the children's stacks using *HyperStudio*. If a color flatbed scanner is available, scan the children's artwork from the field trip. Save the pictures as "PICT" to disk. Place into *HyperStudio*.

Once this is completed, begin the day at the computer center with a child's program on the computer. Discuss with children who's in the picture, who made the picture, whose voice is speaking. Children then can relate this story to books or objects from the field trip.

Other Activities

Making a Classroom Book: During the field trips, let children take photographs. Develop the photographs. From *HyperStudio*, print each child's story using a color printer. Laminate the pages. Bind the pages and photos together to create a brag book. Individual or group books can be created. These books can then be circulated among families to share at home.

Curriculum Integration Ideas

Animals

- Recreate a zoo in the classroom with stuffed or plastic animals
- Catergorize different types of animals
- Feed the animals pretend food made by the children
- Bring animals to school for a special "pet day"
- Sing songs related to animals

Community

- Pretend to be people of different occupations
- Have a special "hat day" in which children wear hats which represent different occupations
- Invite family members to talk about their jobs
- Make a collage of pictures related to specific occupations

Emergent Literacy

- *Wheels on the Bus* (Kovalski, M.)

Expressive Arts

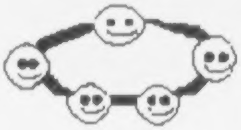
- Draw pictures of their field trip experiences
- Compile a class book of the field trip including photographs and drawings
- Design "Thank You" cards to send to field trip sites

Summary

This unique story created with *HyperStudio* allows the children to relive and share their field trip experiences with family and friends throughout the school year. Computer stories and off-computer materials produced by the children help increase literacy and other skills.

Bonding with Fripples: A Switch Activity

Adaptations can be made to the "Fripple Shop" program on *Thinkin' Things* so that all children can participate in the curriculum activities. Through the use of *Discover:Kenx* and the multiple switch box, activities can be simplified to meet individual needs.



Materials

Computer with System 7.0 and Color Monitor
Thinkin' Things (Edmark)
Discover:Kenx® (Don Johnston Inc.)
Multiple Switch Box

Ahead of Time

Set up the program ahead of time by loading the Fripples setup, attaching the Multiple Switch Box to *Discover:Kenx*, inserting eight switches, booting *Thinkin' Things*, and selecting the "Fripple Shop" program.

Arrange the computer center so that four children can participate in this activity. If needed, demonstrate switch pressing to the children so they understand how the animation on the screen is related to the switch activation.

Computer Activity

Present each child with two switches and encourage them to explore and activate one of their switches. Observe the children's behavior to determine if they understand that they are activating a Fripple by pressing their switches. Further demonstration or assistance may be needed.

Support turn taking. While one child is activating a switch, encourage others to attend to the monitor. Talk about the Fripples as they are activated and how each child is causing a Fripple to animate.

Related Activities

Use familiar toys from the classroom or from home and let the children determine how to sort or classify them, for example dishes from housekeeping, zoo and farm animals, cars, trucks, and planes. Set up activities so children can compare and contrast various attributes to "Find the missing (whatever)," or play matching games such as concentration using the felt figures and the shelves as doors. Elicit the children's help in setting up the activities or encourage them to do it independently.

Fripples can be made from anything and be used to complement the program. Paper bags and various collage materials could be set out at a table or the children could make their own suggestions for making a Fripple. They could also make up a name for another product and decide what it would look like.

Other Activities

An activity can be set up to reinforce scanning skills by selecting Switch Input in the Adult Options and setting the Fripple Shop at the beginning skill level. A large arrow then scans across each row of

Fripples until the switch is pressed. Children can take turns pressing the switch on a desired Fripple to hear a description of it. For children who will need to learn scanning skills, this activity presents an easy way to become familiar with the Fripples and increase visual discrimination skills.

Curriculum Integration Ideas

See suggested ideas in *Creating A Fripple Shop*.

Emergent Literacy

- *Hide and Snake* (Baker, K.)

Summary

By adapting the Fripple Shop activities to meet individual children's needs, these curriculum activities can be used in an inclusive setting. The many offshoot ideas from the software help children develop a variety of skills, ranging from understanding causality to visual discrimination.

Caterpillars - Butterflies, Tadpoles - Frogs

With the use of Explore-A-Story software, children create their own storybooks by selecting characters and objects to place in a chosen background. Text can be written onto each page to produce a customized story which can be printed and read over and over again in class or at home. In this way children can re-create the outdoors right on their computer screen.

Materials

Computer with color monitor
Rosie, the Counting Rabbit (William K. Bradford)
Poster board
Colored pencils
Clear contact or another laminating method
Static cling vinyl (purchased from Dick Blick or another art supplier)
Permanent ink markers

Ahead of Time

Install the program, *Rosie, the Counting Rabbit*. Open the application and become familiar with the graphics and writing options of the program. Note the pages which contain the caterpillars and tadpoles of the program.

Computer Activity

Read the story from the book (which emphasizes counting) or tell the story without emphasizing the counting aspect. Also have *Rosie, the Counting Rabbit* loaded at the computer center. As the children move objects around on the screen, ask questions about the objects, their size compared to other objects, or their quantity. Children should have ample opportunity to manipulate the mouse and move objects around, giving them a chance to make the connection between what they are doing with the mouse and what is happening on the screen. Encourage children to select different objects and characters to place in their picture. Assist in entering the names of their characters and objects. As the words are typed, the children associate their words with the written words. Ask each child to tell a story about their picture or page. As they do, type the children's sentences on the screen.

Print the screens as a book to be shared by the group of children. Read the story to the children or ask them to "read" their page. Multiple copies of the book could be printed so that each child can take a book home to share with family members.

Related Activities

Make vinyl figures in the shape of objects found in the software program. Objects could include flowers, garden vegetables, frogs, tadpoles, trees, lizards, caterpillars, butterflies, apples, eggs, and chicks. Let children select objects and stick them to the static board. (Principle is similar to a flannel board activity.)

As each child places an object on the board, encourage her to talk about what she has selected. *"What did you select?" "How does it move around?" "What can you tell me about how it smells?" "How big is it?" "What kind of noise does it make?" "Where does it live? In a tree, on the ground?"*

Have real objects available that children can manipulate. Ask children to tell a story about the objects.

A classroom theme could be created around one type of object, such as "Things That Grow in the Ground." Encourage the children to find only those objects which pertain to the particular theme both during off-computer and computer activities.

Other Activities

Attach textures to the vinyl pieces so the child can feel the form and identify the object. If vinyl is too thin for adaptations, another type of material may need to be used for objects.

Make an overlay for the IntelliKeys or Key Largo, which contains objects printed from the program. Add a recorded phrase or sound related to teach object. Encourage the children to press the picture to hear the sound or words.

Curriculum Integration Ideas

Expressive Arts

- Make butterfly wings
- Dance and imitate the movements of a butterfly
- Sing songs about insects
- Draw pictures about the field trip

Emergent Literacy

- Read books about insects, such as *The Very Hungry Caterpillar* (Carle, E.)
- Read *The Very Busy Spider* (Carle, E.)
- Make a book with pictures taken on the field trip
- Write experience stories about the pond

Science

- Take a field trip to a pond
- Study the growth of a real caterpillar or tadpole in the classroom
- Make the water table into a pretend pond
- Play with stuffed or plastic insects

Summary

Rosie, the Counting Rabbit brings insects, animals, plants, and other living things found outdoors right into the classroom for children to explore on the computer. Besides playing with these objects on the screen, the children can create their own pages and books with pictures and words. Many exciting computer and off-computer activities can be designed around the environmental theme of this program.

Controlling Familiar Sounds with a Switch

To gain a sense of independence, young children need to have control over their environment. A switch, battery interrupter, and tape recorder can become the means by which children can control something familiar to them, such as the sounds they hear around them. Designing activities with a variety of sounds can help children achieve these early skills.

Materials

Battery-operated tape recorder
Tape of familiar sounds
Battery Interrupter
Switch
Timer

Procedures

Select appropriate switch and secure it in a stable position for the child. Position the child so that he can activate switch with little effort. Attach a timer to the tape recorder and switch. This will allow the tape to play for several seconds before stopping. Activate the switch for the child to direct his attention to the activity. Draw the child's attention to the switch by pointing to it and verbally encourage him to make the sounds go again.

The family can help establish the words to use for prompting or requesting, such as "make more" or "make it go," and use those words consistently with the child. If child does not respond to a verbal prompt, physically assist him in activating the switch to make him aware of what it does.

After the tape stops, allow the child time to voluntarily make an effort to activate the switch or indicate a desire to do so before assisting him again.

When the child activates the switch by himself, verbally reinforce him by describing what he did: *"You did that!" "You made it go!"*

Change the tape to different sounds when the child appears to become distracted easily or loses interest in one sound.

If the combination of the switch and tape recorder in the child's visual field are distracting or confusing, the tape recorder could be placed out of view so that the child focuses only on the switch. Also adding a visually appealing cover to the switch may help in directing the child's attention to it.

Since the focus of this activity is an auditory stimulus, limit other auditory distractions in the environment. Sounds from a radio or television are common in the home and are often overlooked as distractions to the child. If a large room with a high ceiling is used it may be necessary to confine the sound in a small area so that the child is able to focus on the origin of the sound.

Related Activity

Encourage the family to make various sounds, such as whistling, making silly sounds, and singing silly songs while playing with the child. Record these sounds separately on a cassette tape. Also record family members' normal conversations during which they speak the child's name. Record animal sounds, music heard in the home, or other sounds which are part of the child's environment.

Other Activities

After the child becomes familiar with the switch, it may be desirable to use it without the timer. The child would then be required to hold the switch down to play the tape. When using a tape of a silly song, a family member could sing and perform gestures along with the tape and stop when the tape stops. This would add an extra dimension to the activity and may keep the child's attention for a longer period of time.

Curriculum Integration Ideas

Animals

- Use tapes of animal sounds
- Play with stuffed animals that match the sounds
- Record pet sounds from home
- Look at pictures of animals as sounds are played

Emergent Literacy

- *Who Is Tapping at My Window?* (Deming, A.G.)

Expressive Arts

- Draw to music as it plays
- Dance or rock back and forth as switch is pressed for music
- Play a pretend musical instrument or toy one
- Sing along with taped music

Summary

Switch activities can open up a whole world of interaction for a child. By controlling taped sounds or music, a child is playing, learning, and gaining a sense of independence in a familiar and enjoyable way.

Creating A Fripple Shop

The *Thinkin' Things* program and the "Fripple" idea is an easy and convenient means to introduce a cardboard shop for play and has the potential to be more than just a Fripple Shop. It can be used as a way to reinforce skills and concepts, such as matching, classifying, and identifying various attributes. It is also intended to expand on children's knowledge and understanding of their world. Their own interests and ideas can then determine other constructive ways to use the shop in their play.

Materials

Refrigerator Box
Paint/Paint Box
Tempo Material (optional)
Switches
Chime and Light Glow
Electrical Duct Tape
Staple Gun/Staples
Thin Wood Lathes (support)
Velcro
Homemade Fripples/Puppets

Ahead of Time

Create a Fripple Shop using a large cardboard refrigerator box. Cut out a doorway and window and make shelves for the Fipples to sit on. Place a "Fripples To Go" sign in the window. Attach several switches to the front of the cardboard and run the wires to the back. Attach these switches to a battery interrupter and cassette player. Tape descriptions of the various Fripples you'll create to put on the shop shelves. ("Find a Fripple with purple spots and yellow hair.") Later, record descriptions of the Fripples children make. Gather props such as a telephone and cash register to add to the store. See Figure 1. Sample Fripple Shop on page 79.

Create Fripples using paper lunch sacks stuffed with wadded paper, tissue, or shredded paper. Paint and decorate each Fripple, using different colors and designs. Give some Fripples similar attributes so children can later compare and contrast the Fripples. Place the Fripples in a cardboard box and cover it. Put a sign on the outside that says "Fripples." Be sure there are more Fripples in the box than children in the class so everyone has a choice.

Prepare the activity
Set up the cardboard shop without the props during free-choice time allowing time for the children's natural curiosity to prompt their questions and answers and engage their imaginations to talk about what it is and how "we" could use it. An ideal time to initiate discussion among the children may be during the shop set-up time. It should be a child-initiated discussion rather than teacher-directed. Make a mental note of any useful ideas for future curriculum activities, ensuring a basis in the children's interests.

Place a "Fripples To Go" sign in the window, read the sign to the children, and question what kind of a place it might be or what a Fripple might be. These questions will lead children to the idea of it being a shop or store.

Initiate a discussion of what a shop is. Compare it to a store if the children do not mention it first and have them describe and name familiar stores. This provides practice in describing details and could be recorded on tape at a later time.

Questioning
Act as a guide, assisting and encouraging the children to 1) express their own opinions and ideas, 2) think about and answer each others' questions as much as possible, 3) elaborate on each others' ideas.

Question to elicit that a Fripple shop/store is where 1) something is for sale, 2) people go to buy something, 3) someone works to sell a Fripple, and 4) all kinds of people can buy Fripples.

Activity

Gather in front of the shop with everyone sitting on the floor. (Hopefully after the discussion the children will direct the activity.) Ask if anyone recalls what the sign said. If not, read it to the group. Ask the children what they think would be for sale in a Fripple Shop and if anyone knows what a Fripple is.

Introduce the box labeled "Fripples." Point to and read the label, commenting that we could probably learn more about what a Fripple is if we look in the box labeled "Fripples."

Pass the box around and instruct each child to pick one. Allow them time to look at their Fripple and compare it with others.

Ask one of the children to describe her Fripple, prompting the child by questioning if needed. Ask a question or follow up on the child's comment about the Fripple to determine the attribute for the others to look for in their Fripples. (*"That's right, Mindy, your Fripple has yellow hair."*) Ask the child if she would like to put her Fripple on one of the shop shelves.

Ask if anyone else has a Fripple with that same attribute and pick one of the children to bring their Fripple to the shop and put it next to the other one. Reinforce the idea of grouping, saying *"Both of these Fripples have..."* Ask the child to further describe the Fripple, and in some way determine the attribute for the next choice. Continue in this manner until all the children have had the opportunity to place a Fripple on a shop shelf and give a brief description.

Questions should vary appropriately with the developmental level of each individual child to ensure success. If needed, the child could be encouraged to only repeat a description given by the adult. The questions might also be selected for assessing various skills, such as comparing and contrasting.

Other Activities

- Computer: Introduce children to the "Fripple Shop" on the *Thinkin' Things* software program. Demonstrate the program briefly; then let the children explore all the Fripple Shop options. Encourage the children to take turns at the computer. See *Fripple Fun* activity in this section for further ideas on computer activities.
- Art: The children may enjoy making their own Fripples. Have the materials (paper sacks, paper or tissue for stuffing, paint, cotton balls, yarn, and other similar items) set out on the table for them. Collage materials, glue, and tempera paint offer a variety of textures for tactile stimulation, and bright colors and patterns offer visual stimulation. Such materials appeal to the senses of both hearing and smell as the children manipulate them to create their own unique Fripples.
- Dramatic play: Leave the cardboard Fripple Shop set up in the classroom as a dramatic play area so children can play Fripple Shop using their own Fripples, as well as the ones you created. Provide props, such as a telephone, cash register, and other items similar to the ones seen in the *Thinkin' Things* "Fripple Shop" software program.
- Music: Sing "Fripples Songs," such as "This Old Fripple," created by Macomb Projects staff member Amy Betz to the tune of "This Old Man." Create your own Fripple versions of children's favorite tunes, adding hand or body motions so children can "really get into" the song.

This Old Fripple

This old Fripple - it has spots
It wears its hair tied up in knots.
With a great big jump, it hops down to the floor
And rolls itself right out the door.

Curriculum Integration Ideas

Emergent Literacy

- *Christina Katerina & the Box* (Gauch, P.L.)
- *A Princess in Boxland* (Székessy, T.)

Self Awareness

- Make paper bag figures to look like the children
- Feature one child as "star" each week and focus on child's attributes and abilities
- Play guessing game around one child's characteristics and see if children can guess who it is
- Compare child to one of the Fripples
- Talk about the children's similarities and differences
- Play with dress-up clothes to become different characters

Math

- Play "store" with play Fripple money
- Write "receipts" for Fripples sold
- Chart how many Fripples have certain features

Food

- Pretend the Fripple Shop is a grocery store
- Categorize food items
- Pick out foods for breakfast, lunch, and dinner

Summary

The cardboard Fripple Shop provides a means for extending one software program in many directions on and off of the computer. Children may achieve a new awareness of people's features, such as hair color, eye color, or glasses, as they have fun buying and selling Fripples in their Shop. It is an ideal time to subtly reinforce the concept of what a "shop" is and introduce words, such as "customer," "clerk," and "product."

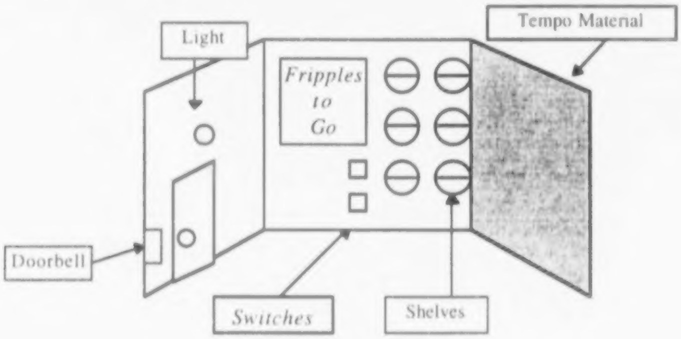


Figure 1. Sample Fripple Shop

Drawing

Children's scribbling and mark making, lead to later recognizable images and lay the foundations for literacy and communication. Assistive technology adaptations, such as computers, adaptive peripherals, software, and adaptive grip devices, make it possible for children with moderate to severe disabilities to participate in art activities similar to those that engage their less disabled peers.

Materials

- Computer with color monitor
- TouchWindow (Edmark)
- *Kid Pix* (Brøderbund)
- Color printer

Ahead of Time

Before the activity, attach the TouchWindow to the front of the computer's monitor. The monitor can be placed at the child's eye level and the keyboard can be moved aside to prevent distractions for the child. Open *Kid Pix* and have the screen ready for the child to use.

Computer Activity

Encourage the child to explore the TouchWindow. If necessary, model for the child how to make marks by moving your finger or the stylus across the window. You may need to physically assist a hesitant child. Allow the child to explore the available options of the program (color, tools, stamps). Talk about the width of the line, curves, and color. Invite the children to talk about their pictures if they feel comfortable doing so. Save the image to disk. Print the pictures and display in the classroom.

Related Activity

Crayon Play

Prepare the art center with drawing and mark making tools; large crayons (without paper wrapper) and white drawing or construction paper (in a variety of sizes and textures). Have these materials available and accessible to the children on a low table.

Invite children to explore the materials with you. Model and demonstrate making marks on your paper. Discuss using soft and hard pressure with the crayon on the paper. Use two crayons together. Use the point, side, and end of the crayon. As you make soft or hard marks on your paper, verbally describe what you are doing. "*When I rub real hard, the marks are strong and bright.*" "*When I move my arm around and around, the marks on the paper also go around and around.*" Be available to facilitate and model interaction with the materials. Follow the child's lead and verbally describe the child's actions and resulting marks. "*When you make your arm go up and down, your lines go up and down on the paper. Tell me how you did that.*"

For young children with physical disabilities, try taping two or three crayons together; use chubby stump crayons or sure-grip crayons; fit the crayon with a type of adaptive grip device or fit the child's hand in an adaptive grip device that straps to the child's hand.

Scribble with a crayon in each hand. Allow children to mark with the non-dominant hand. Children can experiment by mixing colors and/or blending with overlaying crayon marks. Polish crayon marks by rubbing with tissue to make a shiny surface. See if the children can only use dots to create a picture or design.

Other Activities

If a child can not physically reach the TouchWindow on the monitor, remove the TouchWindow from the monitor and place it on the child's lap or wheelchair tray. The monitor can also be placed on the floor, or any other position, so that it is at the child's eye level. An adaptive grip device can be attached to the stylus or the child's hand to facilitate holding the drawing tool.

For the child who is blind or visually impaired, create a tactile overlay with designated areas so the child can select options for drawing. To create a tactile overlay, apply tactile material or puffy paint to a clear transparency. Attach this to the TouchWindow. The child can create a picture by touch and sound. Verbally describe the process as the child touches and hears the sounds when marks are being made. Sandpaper, felt sheets or corrugated paper will provide texture and friction that will create sound as children with visual disabilities draw.

Kid Pix provides some wonderful sound effects when drawing. For the child who has hearing impairment, use sign language while modeling and demonstrating the process.

If using an ImageWriter Printer, use a 4 color heat-transfer ribbon. With the saved picture, print using the heat transfer ribbon and plain computer paper. Iron the transfer onto a child's T-shirt. For the printers such as Color StyleWriter 2400 or Canon Color Bubble Jet printers, use T-shirt Transfers (TR-101) paper. The graphic will be printed directly on the transfer paper which can then be ironed onto a T-shirt or material.

Other software which can be used for the same activities include: *EA*Kids Art Center*, *Kid Pix*, *Kid Pix 2*, *Kid Studio*, and *Kid Works Deluxe*.

Curriculum Integration Ideas

Emergent Literacy

- *The Art Lesson* (dePaola, T.)
- *Mouse Paint* (Walsh, E.S.)

Expressive Arts

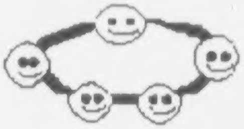
- Draw or scribble to music
- Draw about a favorite story, field trip event, or key experience
- Use crayon on colored construction paper to create a new color
- Color black over the drawing, pressing hard, and scratch/draw with a pencil to reveal color underneath

Summary

Through graphics programs and adaptations all children can express themselves artistically. Computer art activities offer children valuable opportunities for communication, problem solving, and social skill development.

Drawing in the ArtSpace Studio

"The Studio" is a program in the software *ArtSpace* where selected drawings can be recreated. Using an interactive multimedia approach combining sound, photographs, video, and graphics, "The Studio" is designed so children, including those with multiple disabilities, can experience simulated drawing and painting derived from art made by children, with and without disabilities, ranging in age from two to sixteen. Children can simulate the drawing of selected images by repeatedly pressing a switch or clicking the mouse. Children unable to hold a pencil, crayon, or paintbrush can use "The Studio" to recreate images targeted at their developmental level with switch presses. As children print the pictures the excitement of seeing the printed product prompts sharing and increased communication efforts. A single child or a group of children can take turns drawing in "The Studio."



Materials

Macintosh Computer with CR-ROM Drive and Color Monitor
ArtSpace (Macomb Projects)
Optional Input Peripherals: TouchWindow, Switch, *Discover:Kenx*,
Key Largo, or IntelliKeys
Color Printer

Ahead of Time

Create an artist's environment by displaying reproductions of adult artists and originals of children's work. Position the monitor at the child's eye level. Open the program *ArtSpace* and select "The Studio." Arrange the computer center so several children can gather around the computer monitor. To limit distraction, cover the pieces of equipment not being used by children.

Computer Activity

The child-created collection of images in "The Studio" are arranged in groups of three according to Kellogg's (1970) basic developmental stages. "The Studio" consists of a Studio Palette screen and a Studio Canvas screen. From the Studio Palette, children can select the most appealing drawing. The program then moves to the Studio Canvas where the drawing is revealed, a few segments at a time as music plays. On the bottom of the canvas frame are four markers to indicate the drawing's progress. An unfinished marker indicates that a segment or more of the drawing is unfinished. A finished marker is indicated when the drawing has been complete. When all segments are complete, selecting the Canvas causes the picture to be drawn in its entirety. Children can interact with elements of selected drawings or paintings as slowly or quickly as desired. Drawing these images is simulated by pressing the switch repeatedly until the complete image appears. Children will also enjoy revealing the "hidden picture" section by section. Images can be printed if the children so desire.

Other Activities

Draw using low-tech materials such as a Magna Doodle with adaptive magnetic drawing tools.

Introduce children to other switch activated software programs such as *Switch Intro* or *New Frog & Fly*.

Curriculum Integration Ideas

Emergent Literacy

- *Harold and the Purple Crayon* (Johnson, C.)
- Prior to reading a book, talk about who created the pictures for the book
- Read a book about art such as: *Come look with me: Animals in art or Come look with me: Exploring landscape art with children* (Blizzard, G.)
- Draw experience stories about exploring *ArtSpace*
- Create a book of museum images and the children's art work for the library corner

Expressive Arts

- Study the life of a famous artist
- Visit a studio of a local artist
- Invite an artist to visit the classroom
- Design an art exhibit using children's art work

Social Studies

- Play games with art postcards
- Set up a museum shop for children to sell works of art

Science

- Explore and discuss materials artists use
- Mix paints to create new colors
- Add different textures to paints (sand, salt, sawdust, coffee grounds)

Summary

Children can experience the historical and aesthetic value of drawings in different cultures. New vocabulary can be used as children produce drawings and analyze the art work and the art work of others. A variety of activities can be planned around the many categories found in *ArtSpace*.

Exploring Art with ArtSpace

Art museums provide the environment for a wealth of experiences for children of all ages. Through the use of *ArtSpace*, children who are unable to walk through a museum can explore art from their computer.

ArtSpace is a series of spaces where art can be viewed (in a museum with many galleries) or where art is made (in studios). *ArtSpace* provides a field trip simulation without the bus travel, the frantic search for a restroom or the never-ending walk through the long corridors. *ArtSpace* can be used for preliminary museum experiences prior to an actual field trip to a museum or to prepare children and staff for what they are likely to experience, or it can be used as a follow-up activity after the field trip. Art work is categorized as follows: Collage, Lines, Music, Pottery, Sculpture, People, Cultural Diversity, Native American, Farms, Food and Eating, Transportation, Animals, Birds, Flowers and Plants, Trees and Forests, Water, and Weather and Seasons. Input options include mouse, switch or TouchWindow. Adaptations can be designed through switch or touch tablet use so children who cannot use the mouse can enjoy the activities.

Materials

Macintosh Computer with CD-ROM drive and Color Monitor (14" or larger)
ArtSpace (Macomb Projects)
Optional input peripherals: TouchWindow, switch, *Discover:Kenx*, Key Largo, IntelliKeys

Ahead of Time

Preview *ArtSpace* prior to the activity to become familiar with the options. Position the monitor at the child's eye level and move the keyboard aside to prevent distractions. If children need switch access, attach a switch interface to the computer before the activity. This could be a switch input box, *Discover:Kenx*, or IntelliKeys. Attach a switch. *ArtSpace* can also be used with a mouse or TouchWindow.

Computer Activity

Encourage the child to make selections by activating the mouse or peripheral device. Model activating and making choices. Physically assist children to do the same if necessary. Children can choose one of two galleries, "The Adult Gallery" or "The Children's Gallery." In "The Adult Gallery," they will see works of art made by adults, some of them famous, some whose importance to the art world is yet to be recognized. "The Children's Gallery" contains art work from preschool and elementary school children. Both galleries contain examples of two- and three-dimensional art works. See video of various artists discussing their work or explaining a process, such as an adult explaining print making or bronze pouring, or children demonstrating finger painting or collage making. Listen to people's comments about each picture, sculpture, or image and use them to generate discussions with children. Ask questions such as, *"What do you see in this painting?" "What did the artist say about their drawing?" "Where would you like to go now?"* Children can choose to go to another gallery room, go back to the lobby for more choices or to exit the program. Encourage children to take turns when selecting images by passing the switch around the group.

Related Activity

Create an Art Gallery in the classroom. Display and label children's art work in the classroom. Feature a child as the "artist" of the week.

Schedule a field trip to an art gallery. After the field trip encourage the children to talk about what they saw. Ask children questions to see if they can compare their "real" tour of an art gallery to the art gallery in *ArtSpace*. Talk about the people they saw in the gallery. Ask questions such as, *"How did they look at the drawings?" "What was different?"* or *"What was alike"*.

Other Activities

ArtSpace provides children of all ages with an opportunity to explore works of art in a museum without leaving their computer. See Chapter 7 for customizing an *ArtSpace* activity for use with Key Largo.

Select one of the 17 categories in the software, such as "Farm" and design both computer and off-computer activities around that theme.

Curriculum Integration Ideas

Emergent Literacy

- *Harold and the Purple Crayon* (Johnson, C.)
- Prior to reading a book, talk about who created the pictures for the book
- Read a book about art such as*: Come look with me: Animals in art* or *Come look with me: Exploring landscape art with children* (Blizzard, G.)
- Draw experience stories about the field trip
- Create a book of museum images and the children's art work for the library corner

Expressive Arts

- Study the life of a famous artist
- Visit a studio of a local artist
- Invite an artist to visit the classroom
- Design an art exhibit using children's art work

Social Studies

- Play games with art postcards
- Set up a museum shop for children to sell works of art

Science

- Explore and discuss materials artists use
- Mix paints to create new colors
- Add different textures to paints (sand, salt, sawdust, coffee grounds)

Summary

A variety of activities can be designed around the many categories found in *ArtSpace*. Children can learn about the historical and aesthetic value of art in different cultures. New vocabulary can be used as children produce and analyze their art work and the work of others.

Five Little Ducks

A favorite children's story can be turned into an interactive adventure through the use of this special software program. Many off-computer activities can be created around this popular theme.

Materials

Macintosh LC series computer with Color Monitor
Circletime Tales (Don Johnston Inc.)
Switch Interface and Switch

Ahead of Time

Position the monitor on a low table with the keyboard and computer out of the child's visual field. To limit distractions, cover the pieces of equipment that are not being used by the child. Secure the switch in a switch holder or mount to provide a stable position for activation. Position the monitor so that it is within easy viewing for the children.

Open *Circletime Tales*, and select the *Five Little Ducks* story. Under "Settings" select one switch. Use a switch interface with a switch or set up *Discover:Kenx* for Macintosh switch activation. Test the switch with the program before the children use it to make sure it is activating properly.

Read the story "Five Little Ducks" in commercial book form or as a book made from the computer screens. Talk with the children about the mother and baby ducks and what happens in the story.

Computer Activity

Encourage the child to listen to each page of the story, then press the switch when she is ready to go to the next page. Talk about the action on the screen and engage the child in imitating gestures relating to the action, such as swimming. Ask the child to predict what will happen next. Talk about how many ducks have left and how many remain. What will the mother duck do? Have the child talk about what is happening in the story and on the screen. Relate the story to ducks in the child's environment.

With play ducks and a foam board, the child can re-create the story starting with five ducks and ending with just the mother duck. Encourage the child to explore the figures and make up their own story.

In a group activity, children can take turns pressing the switch to turn the page in the story. Imitate sounds and gestures relating to ducks and swimming. For younger children, this activity could be conducted with parents and children together.

Related Activity

Encourage the children to draw pictures related to their interpretation of the story. Put the pictures together as a class book. The children can "write" a story on their page. Read the story together as a group. The book can then be sent home with each child to be shared with family members.

Create a pond environment in the classroom with water table and rubber ducks. Invite children to explore and recreate their own stories about ducks.

Design a foam board with duck figures and encourage the children to play with the mother and baby duck figures. Characters from the program can be captured and printed. Refer to *Appendix* for information about "Capturing Images." Other objects found in a pond, such as lilly pads, frogs, insects, and fish, can be designed and added to the scene. Attach Velcro to all objects and characters so that the children can then play and create their own pond scenes.

Make craft stick figures from the mother and baby ducks. Encourage the children to play with the figures and re-enact the story from the computer or make up a new story about the ducks. Look at the similarities and differences between the baby ducks.

Read other books about ducks, such as *The Ugly Duckling*. Discuss the differences and similarities in the stories. After children explore *The Five Little Ducks* story, activities could be designed around mother animals and their babies or the sounds animals make.

Other Activities

Variation with Key Largo

To provide a larger activation area an overlay can be made for Key Largo and *Discover:Kenx* so that the entire surface of the device asks like a switch press. A large picture of the mother duck could be placed on the overlay to direct children's attention to the device.

Curriculum Integration Ideas

Animals

- Create a pond environment so that children can explore the movements of ducks on water
- Add other objects and creatures to the pond
- Take a field trip to a local pond where ducks live—observe the ducks
- Watch a video of mother and baby ducks and other animals

Emergent Literacy

- *Have You Seen My Duckling?* (Tafuri, N.)

Sounds

- Listen for animal sounds in the school or home environment
- Listen to a tape of animal sounds
- Pick out sounds from the animal video
- Listen for animal sounds on the field trip to the pond

Science

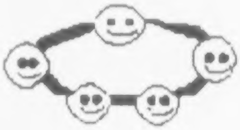
- Imitate how various animals move in their environment
- Explore the simplicity and speed of their movements
- Relate their motions to human movements
- Explore duck families and other animal families

Summary

A popular children's story becomes the springboard for many group and individual activities. The children's experience with the story on the computer leads to exploration of families of ducks and their environment. The sounds and motions made in the program lead to activities ranging from simple imitation to identification of a variety of different animal sounds and movements. Through off-computer activities and individual adaptations, each child is given the opportunity to participate in experiences related to the story. Many skills, including emergent literacy, cognitive, communication, and motor can be enhanced through the design of the activities.

Forgetful

A charming story about a forgetful bear can be the starting point for many curriculum ideas. The switch-operated program ensures that all children can participate in turning the pages in the story.



Materials

Macintosh LC series computer with Color Monitor
Storytime Tales (Don Johnston Inc.)
Switch interface and switch

Ahead of Time

Position equipment so the monitor is at a comfortable eye level for the child. Move extra equipment out of the child's visual field. Place the switch in a stable position on the table.

Open the program, *Storytime Tales*, and select *Forgetful's Secret*. Select one switch option under "Settings." Attach the switch to a switch interface box or the input box on *Discover:Kenx*. If using *Discover:Kenx*, load the Macintosh Switch set-up.

Computer Activity

Encourage the child to listen to the story being read on each page. After the auditory and visual cue is presented, encourage the child to press the switch to see and hear the next page of the story. Talk about each screen and draw the child's attention to the animation after the page is read.

Related Activity

Print the screens as pages of the story and assemble into a book. Read the story to the children before the computer activity. Ask them to relate their cooking experiences. Any similar to Forgetful's? The book could also be used along with the software and for activities following the computer time.

During snack time the children could help bake a cake. They could take turns adding the ingredients. Before adding the mix, ask them if it goes on the table or in the bowl. *"Would it be the same cake if the mix was spread on the table?" "What do they need to do before adding the egg?" "What would happen if the egg was mixed in the way Forgetful did it?" "How would the cake taste?"* This activity can be used for sequencing and problem solving skills.

Since the product of Forgetful's baking experience is a birthday cake, this activity could be used on one of the children's birthdays. After the cake bakes, a birthday celebration can take place during snack time. This can lead to talk about ages, and other children's birthdays. The decoration of the birthday cake can be an activity in itself. Each child could contribute a design.

Encourage children to draw pictures of their friends and experiences in school. Put the pictures together as a class book. Children can "write" a story on their page. Read the story together as a group. The book can then be sent home with each child to be shared with family members.

Other Activities

To provide a larger surface for activation, this program can be used with the Key Largo and *Discover:Kenx*. An overlay can be designed which will allow activation with any press of the device's surface.

Curriculum Integration Ideas

Cooking/Snacks

- Put real ingredients together for cake
- Decorate cake for someone's birthday
- Play with baking supplies in housekeeping center
- Make cakes out of playdough

Expressive Arts

- Make a birthday present for someone—family or friend
- Draw a birthday surprise for someone
- Draw a picture of your birthday cake
- Make birthday pictures out of pudding
- Use magazine pictures of eggs and other ingredients to make collage of what goes into a cake
- Have a pretend birthday party

Self-Awareness

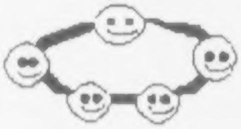
- Talk about each child's age
- Sequence oldest to youngest children in class
- Discuss what months, days are the birthdays
- List favorite things to do on birthday
- Chart what kind of cake they like

Summary

A simple story about a forgetful bear can be used as the basis for a variety of activities which enhance sequencing, problem solving, literacy, and endless creativity. It can be especially suitable on a child's birthday, but will be enjoyed by all children the whole year. Birthday activities are favorites with all children and this story program provides an opportunity for children to expand their skills as they enjoy the computer experiences.

Fripple Fun

Through Edmark's *Thinkin' Things* program, young children can development skills in color recognition, visual scanning, and visual discrimination as they explore the many charming Fripples creatures in the "Fripple Shop." Activities can be designed to enhance this skill development as the Fripples are integrated into various parts of the curriculum.



Materials

Computer with System 7.0 and color monitor
Thinkin' Things (Edmark)
Laminated Fripples (enough that each child may have a choice)
Cardboard shop (see Creating a Fripple Shop)
Color Printer
Materials for making own Fripples (optional)

Ahead of Time

Install the *Thinkin' Things* program on the computer. Review and familiarize self with the program. Create Fripples by drawing them freehand or capture the images from the program (Directions are in the Appendix) and print those. Laminate the figures for durability. Prepare key questions to engage the children's imagination and conversation, keeping it relevant to the content, for example, "*Who goes to these stores?" "What is in the store?" or "How do you buy it?"* Questions may occur as the children look at pictures of familiar stores or places of business. The cardboard shop created in the previous activity can be set up ahead of time or during free-play to allow the children's natural curiosity to prompt questions and answers serving to help the adult assess what they already know.

Computer Activity

At the Computer Center demonstrate the "The Fripple Shop" program by clicking on all of the options and describing them. To reinforce how "The Fripple Shop" program is played, encourage the children to each take a turn and pick one correct Fripple for a customer before choosing another center.

Related Activity

Gather in front of the cardboard shop and initiate or elicit a discussion of what a shop is, looking for references to or comparing it to a store if the children do not mention it first. Pictures of familiar stores might prove helpful to launch the discussion but as much as possible it should be child-initiated rather than teacher-directed. Thus questioning should be spontaneous and related to the children's expressed ideas.

Pass around a box basket of laminated Fripples and encourage the children to choose one Fripple. Allow them to briefly look and compare their Fripples. Pick a child to describe their Fripple and bring it to the felt board. Ask if anyone else has a Fripple with one of the attributes mentioned and ask one of them to describe their Fripple and bring it to the board. Reinforce the idea of grouping, saying "Both of these Fripples..." and in some way determine another attribute to look for or repeat one already given by the children. Continue in this manner until all the children have had a turn. To ensure success, questions should vary appropriately with the developmental level of each individual child encouraging them to only repeat a description given by the adult if needed. Using pictures of the Fripples and the attributes used in the program can help the adult to assess the children's understanding and set the appropriate level to play the program. It also offers children the opportunity to practice recognizing or learning the attributes used in the program.

Other Activities

To Gear Down: In the "Adult Options" set the program at the easiest level and encourage the children to click on the Fripples to hear each one described. With a switch and *Discover:Kenx*, a setup can be created with the Multiple Switch Box so that 8 switches are presented to the child. When he presses one of the switches, one of the Fripples describes himself. This creates an awareness or causality level to the activity for those children who are not ready for more advanced disciminatory skills. See the chapter on *Customized Curriculum Activities* for directions on how to create this *Discover:Kenx* setup.

Curriculum Integration Ideas

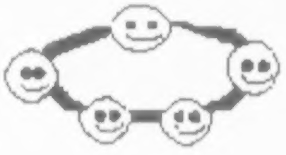
See suggested ideas in *Creating a Fripple Shop*.

Summary

The interesting attributes of funny-looking characters in a software program become the focus of many levels of curriculum activities. By looking closely at all of the features of these small software creatures, children may gain an awareness of similarities and differences in people and objects in their environment. All children can participate in the Fripple activities and gain a variety of developmental skills.

Frog & Fly Switch Activity

An adapted activity using a big book, stuffed toys, and a simple switch provides children with severe disabilities a means of achieving developmental goals such as communication, beginning scanning skills, fine motor, and cognition.



Materials

For Macintosh Computer:
Macintosh Computer with color monitor
Frog & Fly (Bill Lynne Software)
Switch Input Box
Switch
Jump, Frog, Jump (Kalan, R.) Big Book version
Display communication board made from foam core board (20" X 16") and Tempo material
Glue
Toy stuffed frog and a fly with male Velcro attached to the backs
Enough toy frogs for each child
Brightly color yarn

Ahead of Time

Create a display board from foam core board with a low pile material such as "Tempo" glued to the board. Let it dry. Locate a stuffed frog or fly or create one from left over Tempo material. Attach male Velcro to the back of the stuffed frog and fly.

If the switch input box is not attached to the computer, connect the input box and switch. Boot the software program. Arrange the computer center so that all children can gather around the computer monitor. If having the computer on will distract the children, place a sheet or computer cover on the monitor. When ready to use, simply remove the cover.

Gather the children to the reading center. Encourage all children to sit on the carpet or in an adaptive seat if needed. Give each child a toy frog. The children can manipulate the toy while the story is being read. Read the book *Jump, Frog, Jump* (Kalan, R.) to the children. After the story, ask each child to choose a frog from the display board and pull the Velcro frog from the board. If the child is able, ask him to place the frog above or below the fly. Talk about why and how the frog would catch a fly. To take it a step further, use the brightly colored yarn to show how the frog's tongue would catch the fly.

Computer Activity

Bring the children to the computer center. Take off the computer cover or sheet. Activate the switch to demonstrate the program's operation to the children. Follow the horizontal movement of the object with your finger until it is partially across the screen, then press the switch again to stop the fly.

Describe what you are doing as you demonstrate each step to the child. When using *Frog & Fly*, follow the movement downward with your finger as the fly drops quickly vertically.

Ask children to take turns pressing the switch to start the action while watching the monitor, then to press the switch again when they see the object appear at the top of the screen. Verbally reinforce the children as they press the switch by describing what they are doing. As children take turns, see if they can catch or (tickle) the fly with the frog's tongue. If some children are unable to do this, encourage modeling from the other children.

Related Activity

To reinforce visual tracking and eye-hand coordination, play a game such as the following with a stuffed frog or fly or puppet. Hide a puppet out of the child's visual field and place a toy or object in front of the child within arm's reach. Ask the child to watch for the puppet to appear, then to give the puppet the object before he disappears. Move the puppet slowly across the child's visual field and out of view at the other side. Encourage the child to pick up the object and give it to the puppet before it is gone. As the child gains coordination, the puppet's movements can become progressively faster.

To become familiar with using a switch, have the child stop and start various classroom activities by pressing his switch. His switch could be connected to a bell or battery-operated tape player to make more noise or music so the other children can hear his signals better.

Other Activities

Tell the child that he can start the program whenever he is ready. Explain that he is to stop the fly before it moves across the screen so that the frog can eat. If the child misses pressing his switch, encourage him to press his switch to bring the fly back. The fly's movement will slow down after a switch press is missed.

The child may initially press the switch constantly without realizing his own control of the action on the monitor. Demonstration of pressing the switch at the appropriate time along with physical assistance may be needed.

Curriculum Integration Ideas

Emergent Literacy

- Read children's books about frogs
- *Jump, Frog, Jump!* (Kalan, R.)

Expressive Arts

- Make paper frogs and flies and attach strings
- Dance with paper frogs
- Sing songs about frogs
- Draw pictures of favorite things about the software
- Pretend to be frogs—jumping, crawling, moving on scooter boards

Science

- Take a field trip to a pond
- Create a pretend pond in the classroom for the toy frogs
- View a videotape of real frogs

Summary

A simple program, such as *Frog & Fly*, can be the springboard for activities which help children develop skills ranging from attending to problem solving. By focusing on the environmental theme, a variety of activities both on and off the computer can be designed.

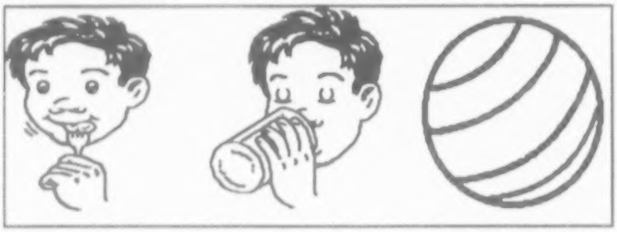
Making Choices With IntelliKeys

Through the use of IntelliKeys young children can communicate their desire for food or play items. By starting with three choices on an overlay, a child is given the opportunity to become familiar with the use of the device before progressing to a larger number of pictures.

Materials

Macintosh Computer with Color Monitor
IntelliKeys
IntelliPics (IntelliTools)
Overlay with three pictures
Battery-operated toy
Picture cards (same as on overlay)

Communication Overlay
Eat, Drink, I want to Play



Ahead of Time

Design an overlay (see "Creating an IntelliPics Overlay" in Chapter 7) for the IntelliKeys with three large areas. One area will be designated as food or "*I want to eat.*" The second area will be used to indicate a desire for drink, such as "*I am thirsty*" or "*I want a drink.*" The third item will indicate "*All done,*" or "*I want to play.*" Choose three pictures from the *IntelliPics* picture library, such as a person eating or drinking or a picture of food and drink, and a person signing "all done" or a picture of a toy for playing. Pictures could also be used from the child's communication board or scanned photographs could be imported. Use whatever pictures hold the most meaning for the child. Print the overlay and laminate it or cover it with clear contact paper for durability.

Computer Activity

Have the child's food and drink nearby as well as a chosen toy for playing. Initially, you may wish to place a small piece of food or the drink glass directly on the appropriate area of the IntelliKeys overlay (or on a plate on the overlay). As the child reaches to make the selection encourage him to press the area of the selection. For example, if the child reaches for the food, encourage him to press the food section of the overlay.

Be sure to describe the actions the child is making rather than telling him he is doing a good job. The more you describe the child's action the more you reinforce the word-to-action transfer that is so important in communication.

When the child activates the IntelliKeys, give him what he asked for. Verbally reinforce the child by stating how he communicated to you. "*You told me you wanted something to drink by pressing the drink spot. Here is something for you to drink.*" Give the child enough liquid for one drink and then remove it and wait for the child's next request.

Continue using the overlay with or without the computer during snack or mealtime. When you feel the child has communicative intent, move to other functional words. Incorporate them as a separate overlay.

Related Activity

Use the same overlay or make a second copy of the overlay for use when the child is not at the computer. Use the overlay during meal or snacktime. Be sure to have a toy available should the child decide to select the "play" option. Other three-choice overlays could be developed for the child to use either on or off the computer as he gains understanding of communication intent.

Some children may need tactile material to identify objects on an overlay. Adapt the overlay with tactile material cut out in the same solid form as the pictures on the overlay. For very young children, a small version of the item could be adhered to the overlay.

Attach three switches to three different battery-operated objects, such as toys and a tape recorder. The child can explore the switches and their activation. After he has been introduced to what each switch controls, encourage him to choose one item to activate. After he has made his selection by pressing one of the switches, remove the other two choices. Provide time for the child to play with the chosen toy before presenting the other switches again. The child will begin to learn that he is communicating a choice through his switch pressing.

Other Activities

As the child progresses, branching could be added to the activity. When the child indicates a desire for food, then present an overlay with three choices of food items available. Design three overlays, one with three food items, one with three drink items, and one with three choices of toys or other activities.

Develop several other three-option boards designating functional words. These words should relate to needs a child would express during daily home or classroom routines.

Determine whether the child can handle more than three choice items and begin to expand on the number of options presented in the board.

The Nursery Rhyme Overlay on the *IntelliPics* program could be used to indicate a choice of four nursery rhymes to activate on the computer. The printed overlay and set up come with the software. The overlay contains five activation areas, including four nursery rhymes, and one area for continuing the rhyme, since each press gives only a short part of the rhyme.

Curriculum Integration Ideas

Emergent Literacy

- Make choice of book to be read
- Sequence a story through pictures on overlay
- Create a story through choices of pictures
- *Mama, Do You Love Me?* (Joose, B.M.)

Expressive Arts

- Use an overlay with choices for music
- Play music for other children while they dance

Summary

Through the IntelliKeys and a customized overlay, young children can communicate their choices for food or other items. The many options in the software make it applicable for beginning communication as well as for a variety of curriculum activities.

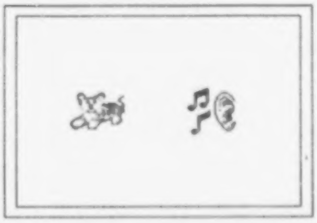
Music and Sounds With a Switch

Most young children find a special enjoyment in making and listening to music and sounds. Through a simple switch and computer activity children with disabilities are given the opportunity to choose choices and what they want to hear and to control the sounds themselves.

Materials

- Macintosh computer with color monitor
- *Discover:Kenx*
- Switch
- Color Printer/Paper
- *Golden Sing Along Books*
- Toy Cat (Battery Operated. *Purrs* when touched and *Meows* when talked to.)

Ahead of Time



Create a scanning setup using *Discover:Kenx.* as shown in the picture. See *Customized Activities*, page 123 for instructions on how to create your own scanning overlay.

Load the customized setup before the child is brought to the computer center.

Computer Activity

Have a *Golden Sing Along Book* and toy cat ready for this activity. Attach a switch to the *Discover:Kenx* input box and load the setup. In this scanning array, the child presses the switch to initiate the action (start the array scanning). After the visual and/or auditory cue, the child presses switch for the desired results (cat or music book). When the child activates the switch for the toy cat, give the child time to play with the cat at the computer center. After the child begins to lose interest, remove the cat and ask the child to make another choice. When the child activates music, give the child the music book to play with or read a page to her. Encourage the child to scan to make choices and to activate the speech. Allow plenty of time to practice.

Related Activity

An activity can be designed off-computer with two switches and sound-making objects, such as a battery-operated music toy and a tape recorder. Attach one switch to the toy and the other switch to the tape recorder. Encourage the child to explore the switches to activate the sounds. If needed, provide assistance or model pressing the switch in the beginning.

Other Activity

A similar activity could be designed for use with the TouchWindow. Instead of scanning, the overlay could be set up for direct select. See *Snacktime Activity* for further ideas.

Design an overlay with two choices for songs. Encourage the child to select one of the songs and press on the switch to activate the recorded music. Children in the class could sing or dance to the song as the child plays the music with his switch.

A music and TouchWindow or switch activity could also be planned around clean-up time. One child presses the switch to activate a song while the other children clean up the toys.

Curriculum Integration Ideas

Animals

- Have a pet day when children can share their pets from home
- Visit a pet store
- Play with stuffed or plastic animals
- Make a pretend farm in the classroom
- Pretend to be a favorite animal

Emergent Literacy

- Read books about cats and other pets
- Label animal toys in the room

Expressive Arts

- Draw pictures to go along with music
- Dance to music from the computer

Summary

Through a specially designed computer activity a young child is given the opportunity to express choices with a switch press. Playing with a toy cat or listening to music becomes the child's own choice.

My Dog

Since most young children love animals, a software program, such as *Ruff's Bone*, which focuses on a dog's silly antics, quickly becomes a children's favorite. By designing activities around, not only animals, but the scavenger hunt theme of the software, children are offered a variety of experiences.

Materials

- Computer with Color Monitor
- (4 MB RAM with System 7.0 or 2 MB RAM with System 6.07/6.08)
- CD-ROM Drive
- *Ruff's Bone* (Brøderbund)
- TouchWindow or Mouse

Ahead of Time

Position equipment so that the monitor is at a comfortable eye level for the child. Secure TouchWindow to the monitor with Velcro. Under "Control Panel" select "TouchWindow" and calibrate the Window to make sure it is working properly.

Open the CD-ROM, *Ruff's Bone*, and select "Let's Play." This option gives the child an opportunity to interact within each screen.

Computer Activity

Encourage the children to listen to the story being read on each screen. Then explore the objects and characters on each page. When the child is finished exploring one page, she can turn the page to continue. Ask the child what her favorite part of a screen is and why.

In a group activity, children can take turns activating objects on the screen. Ask them to predict what their chosen object or character will do before pressing. Encourage them to retell the story. Ask, *"What is your favorite part?" "What happens in the end?"*

Related Activity

Storybook

Since the software comes with a storybook, this book could be read to the children before the computer activity. Encourage the children to talk about their dogs. The book could be left in the book center so that the children can read it on their own.

Playboard and Figures

Select several objects and characters from the program to print. Attach the figures to cardstock and laminate. Attach Velcro to each figure so children can play with the objects and characters on a foam board. Encourage them to re-create Ruff's story or to create a new story about the dog and his bone.

Scavenger Hunt

Design a scavenger hunt so children search for a dog's bone in the classroom. Leave picture clues throughout the room to lead the children to the next spot. This activity could be conducted with individual children, small groups, or a large group.

Animal Food
Besides bones, what do dogs eat? What do other pets eat? Make "puppy chow" snack during snack time. Children could pretend to be dogs and try to eat without using their hands. Encourage the children to talk about foods their pets eat. If there are classroom pets, what do they eat? Could they eat bones?

Funny Bones
Where do bones come from? Explore a model or picture of a skeleton and encourage the children to talk about why we have bones and why so many? How do our bones grow? If possible, explore an animal's skeleton from a book, picture, or model. How is it different from ours?

Pet Album
Ask families to send photographs from home of any house pets which the children have. These pictures can then be shared as part of a unit on Pets. Children can talk about their pets. Put together a class book on pets.

Encourage the children to draw pictures of their pets or other animals. Put the pictures together as a class book. The children can "write" a story on their page. Read the story together as a group. The book can then be sent home with each child to be shared with family members.

Other Activities

Create *Discover:Kenx* set ups with a few hot spot choices or communication overlays with pet pictures—to talk about pets and foods.

Curriculum Integration Ideas

Animals

- Explore foods animals eat
- Discuss where dog bones come from
- Explore what animals eat bones
- Draw pictures of pets
- Create collage of animal pictures—which ones are good pets
- Put together book about pets and their foods

Science

- Explore why we have bones
- Discuss how our bones grow—talk about nutrition
- Explore skeleton model
- Read book on bones
- Compare human and animal bones in skeleton models
- Invite an archeaologist to the classroom—talk about people who look for old bones
- Examine pet foods—what is in them and why

Cooking/Snacks

- Cook bones in a soup for snack
- Eat foods during snack time that help our bones grow

Summary

A story about a dog's search for his bone can be the basis for many classroom activities. Through exploration of bone structure, nutrition, and animal life, children's science knowledge will be enhanced. Family pictures of pets and children's drawing and writing are great foundations for class books to help increase emergent literacy. Through adaptations and simplifications of the software, these activities can be designed for participation of all children.

Post Office

KidDesk is a desktop program that allows young children to launch their own programs easily without adult assistance. When setup properly, *KidDesk* will keep young children out of any adult program and desktop not selected for their use. This desktop program will allow young children to explore, experiment, make choices, and take risks in the computer environment.

Materials

Macintosh or MS DOS computer with color monitor
Color printer
KidDesk (Edmark)

Ahead of Time

Have *KidDesk* installed onto the classroom computer system. Personalize the program for each child in the classroom. Capture the child's picture by 1) scanning their photo 2) using a QuickCam or 3) using a QuickTake Camera. Import the child's photo into their desktop. If none of the above applications are available for capturing the child's photo, have children draw a picture of themselves in a graphics program (*Kid Pix/ClarisWorks*) and save as a "PICT." Import into each child's desktop. Personalize each desktop with a welcome message.

Organize a field trip to the local post office. Arrange for the children to talk to the mail, UPS, or Federal Express person. If a mail vehicle delivers on a regular basis to the school, arrange for the children to tour the vehicle on school grounds.

Computer Activity

Encourage each child to come to the computer center. With an adult's assistance help the child to create an e-mail message to other children within the classroom. When children click on the mailbox from their desktop, they will enable the e-mail portion of *KidDesk*. From here they can then read, print, or delete their mail from their desktop. During free play, children can check the computer for their voice mail and/or written correspondence from the other children.

Related Activity

Let the children make Post Office hats and bags. Create big mail boxes out of cardboard boxes in the room for children to mail their letters they have created on the computer.

Create a Post Office from large cardboard boxes. Cut out a doorway and several windows. Let the children paint/mark the Post Office. From smaller boxes create small mailboxes for each child with each child's name labeled clearly on the box. Set up the cardboard post office to allow the children's natural curiosity to prompt language and dramatic play and to engage their imagination to talk about what a post office is and how "they" can use it.

Take a field trip to a Post Office. After the field trip, discuss with children what they saw during the trip. Ask questions such as: *"How do you create a letter?" "How can you create one on the computer?" "How do you mail the letter?" "How do you send voice mail? How do you receive voice mail?"*

During circle time, gather the children to the computer center. Open *KidDesk* and select the "Calendar." Click to view the calendar for the current month. Ask the children what the weather is like outside. In the Day Box, type the children's response. On the calendar day, select an icon to correspond to the weather (sunny, snowing, raining). At the end of the week or month, print out the calendar and talk about how many days were sunny, snowy, rainy, or cloudy.

Compose "Thank You's" on the computer and send out to classroom assistants or families who have volunteered to help in the classroom.

Curriculum Integration Ideas

Expressive Arts

- Make postal hats and mail bags
- Decorate cardboard mail boxes
- Create cards and pictures to mail to friends

Emergent Literacy

- Sign the messages sent to classmates
- Sort the mail by names
- Read e-mail from computer
- Print out computer messages
- Write a letter to your family

Math

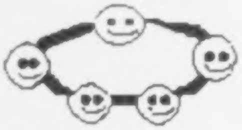
- Count the pieces of mail in your mailbox
- Mark on the calendar the days that mail is received
- Group the mail into piles according to size of envelope

Summary

Young children can achieve many skills, including literacy and social skills, as they create messages and deliver them to classmates. Use of the *KidDesk* program can provide desktop management, while stimulating many new curriculum activities.

Self Portraits - My Story

Opportunities for increased awareness about themselves and those around them, can provide a way to promote a positive self image for young children. The many exciting features of technology can help children presonalize a story about themselves.



Materials

Computer with Color Monitor
(4 MB RAM with System 7.0 or 2 MB RAM with System 6.07/6.08)
CD-ROM Drive
HyperStudio 3.0 (Roger Wagner)

Ahead of Time

Ask families to send photographs from home, including pictures of their child as a baby, and photos of other family members and pets, to school to be used as part of a customized program. Children can talk about their pictures as they are brought to class and how they can put their story on the computer.

Open the program, *HyperStudio*, and select "New Card." Create a stack of cards about each child in the class by placing photographs and drawings in the program. Record the child's voice explaining what each picture is. If possible, record family member's voices introducing themselves. This could be done during a parent group meeting at the beginning of the school year or during a special visit to the class. Add these voices to the child's stack where possible.

Design each stack so there are designated hot spots child can identify easily. Add some surprise spots for interaction.

Encourage the children to draw a picture of themselves, family members, and pets. These drawings can then be added to their stack and animated.

Computer Activity

Encourage children to share stories about themselves with the other children. They can demonstrate their own story to the class or have an adult assist them in showing the stack. Each child can talk about the contents of his story and his family members.

Print out two copies of each child's story. One copy can be placed in the book area of the class and the other copy can be sent home.

Related Activity

Encourage children to do some record keeping on variables related to the families. Children can keep track of how many brothers and sisters are represented by the whole class, as well as how many live in town, country. How many have pets, and which kinds?

The children could put together a class album of school activities similar to their family books. Encourage the children to talk, draw, and write about their friends at school.

Encourage the children to draw pictures of their friends and experiences in school. Put the pictures together as a class book. The children can "write" a story on their page. Read the story together as a group. The book can then be sent home with each child to be shared with family members.

Other Activities

Using *HyperStudio* other stacks can be created around classroom themes or field trips. Children can contribute pictures, photographs, and recorded voices. Family members may be interested in helping put together stacks with the children.

Curriculum Integration Ideas

Activities which help children increase their awareness of self-image include children's experiences as individuals, members of a family and members of a class.

Self-Awareness

- Talk about whether girl or boy
- Discuss hair and eye color
- Try children's favorite foods
- List favorite book or computer activity

Emergent Literacy

- *I Like Me* (Carlson, N.)

Community

- Chart how many brothers and sisters children have
- Discuss favorite activity at school
- List friends at school
- Chart where children live (town or country)
- Graph where children live
- Sing songs and finger games about the community
- Chart how many children take bus or have parents bring to school
- List the birth order of child

Summary

Children can create a story about themselves on the computer, complete with video and animation. These activities help enhance a variety of emergent literacy skills as well as promote a positive self-image for the child. The technology offers an exciting way for children to share their family and school experiences. Through adaptations all children can participate in this story making activity and can share their story equally.

Snack Choices Using a TouchWindow

This simple activity is designed for children who are beginning to develop concepts of causality, discrimination, and communication. A child can indicate a choice between food and drink and then make further preferences.

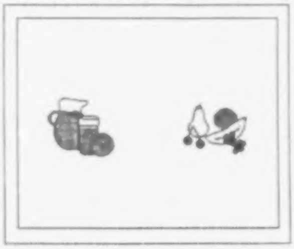
Materials

- Computer with color monitor
- *Discover:Kenx*
- Color Printer/Paper
- TouchWindow
- Materials to make an overlay for the TouchWindow
- Pictures of crackers or juice

Ahead of Time

Make a set up with an overlay using IntelliKeys or *Discover:Kenx* as shown in the picture below. See procedures in Communication Overlays in *Customized Curriculum Activities,* page 123.

Turn the computer off; connect the TouchWindow to the ADB port on the back of the computer. Attach to the monitor or use it with overlay and position the TouchWindow on a table or wheelchair tray in front of the child. Turn on the computer. Under the Apple Menu, select TouchWindow. Calibrate the TouchWindow. Arrange the computer environment so the keyboard is not in sight and the monitor is at eye level for the child. Print a color overlay. Laminate the overlay for durability. Load the setup before the child is brought to the computer center.



Computer Activity

Have fruit and juice (in a non-spill cup) easily accessible by the computer center. Encourage the child to make a choice by activating the TouchWindow to make a choice. After the child has made a choice (e.g. juice), give the child a drink of juice. For this activity, allow enough time for the child to have his/her snack time at the computer.

Related Activity

Use two switches and two battery-operated toys to present child with choices. Encourage child to explore switches to play with the toys.

Other Activities

Overlays can be created around classroom themes and activities to provide the child with choices.

Curriculum Integration Ideas

Provide a variety of foods
Provide a variety of objects within the classroom
Provide choices that are thematic of the classroom

Emergent Literacy

Cooking Dinner (King-DeBaun, P.)

Summary

Adaptive equipment and software can become important communication tools for young children. With a touch of the hand a child can indicated choices of food, drink, toys, or classroom activities.

Sounds Around Me

Sounds are a natural part of a child's environment. Since hearing is one of the five senses, children learn about their world through sounds around them. "Make It Sound" is a program component of the software, *Switch Intro*, which presents the child with a variety of realistic sounds and pictures. This program can be used to design activities for children who are at an early cognitive level. By pressing a switch, the child controls the repeating sound or changes to a new sound. By combining off-computer materials, such as sound-making toys, a picture book and tape-recorded sounds, many activities can be developed around this simple program. These activities can be adapted for the participation and enjoyment of children with hearing impairment.

Materials

Macintosh LC series computer with Color Monitor
(4 MB RAM with System 7.0 or 2 MB RAM with System 6.07/6.08)
Macintosh Switch Interface
Switch
Switch Intro
Switch Holder (optional)

Ahead of Time

Position the monitor on a low table with the keyboard out of the child's visual field. To limit distractions, cover the pieces of equipment that are not being used by the child. Place a suitable switch in a stable position on the table in front of the monitor (or on the child's wheelchair tray). Have the group of toy objects within easy reach to use during the activity.

Boot the program, *Switch Intro*, and select "Settings." Set the switch input for one switch use and set other options appropriately. Select "Making Sounds" from the picture menu.

Computer Activity

Encourage the child to explore the switch and press it to hear a sound. Talk about what the sound is and how it relates to the picture on the monitor. Offer the child the toy object with which similar sounds can be made. Design the activity to be exploratory so that the child can play with the toy and press the switch to hear the sound as often as he wants.

To test the child's understanding of causality, ask him how to make the sound (from the computer) again. Observe his switch pressing behavior. When he seems to tire of one object, ask him if he wants another picture or sound. To change to a new picture and sound, press the number 3 on the keyboard. Repeat the activity offering corresponding toys to pictures on the monitor.

If the child is hesitant to press the switch, provide physical assistance or model switch pressing for him.

Related Activity

Assemble a group of toy objects similar to those which appear as pictures in the program. Design activities around the objects focusing on the sounds which they produce. Talk about the sounds, relating each sound to the object which produces the sound in the environment. Talk about similar sounds the children may hear at home. Encourage the children to imitate the sound.

A book can be made with pictures printed directly from the program. Each screen can be captured as a "Picture" by pressing Command-Shift-3. The captured image is saved as a "Picture" on the desktop. The picture must then be placed in a graphics program, such as *ClarisWorks* (Claris), to be printed. The picture book can be used with a group of children or on an individual basis, to familiarize the children with the objects they will later see on the computer. A variety of activities can be designed around the toy objects and the picture book.

Other Activities

This activity can be designed for choice-making, by selecting the Two Switches option in the program's "Settings." By pressing one switch the child can hear the sound. With a press on the second switch he can change to a new picture. In this way the child controls which sound and picture he wants.

The Two Switches option can also be selected with the adult controlling the switch for the picture change while the child controls the switch for sound change. This arrangement ensures sufficient time on each picture to talk about the object and sound. Otherwise, with very young children rapid switch pressing may defeat the purpose of the activity. Repeated picture and sound change which results from rapid switch pressing does not allow sufficient time to focus attention on any one picture. Also with random switch pressing the child may not understand him causing the rapid changes on the monitor.

Curriculum Integration Ideas

Community

- Make tape recordings of animals or pets, children playing, musical instruments, people talking, sounds from home, children playing, computer programs sounds, and sounds unique to each room

Emergent Literacy

- *Rainsong Snowsong* (Sturges, P.)
- *The Very Quiet Cricket* (Carle, E.)

Environment

- Make tape recordings of birds chirping, animals sounds, and insects sounds

Self-Awareness

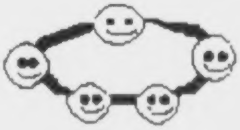
- Make tape recording of traffic sounds, rain falling, sounds the child can make, vocal imitations of familiar sounds, blowing wind, sounds or words the child can say, children running or walking, and playground noises

Summary

A simple program about sounds can be useds as a means for learning more about the sounds in the child's environment. By combining the program's visual and auditory feedback with off-computer materials, such as books and toys, the child is encouraged to explore familiar and novel sounds. By including signing and adaptations in equipment and materials each child is ensured equal participation in the activities.

Spending Time with Grandma

Spending time with grandparents is somethings many children do. This program follows Little Critter and his grandmother's on their adventure to the beach. Opportúnites for intergenerational activities are easily incorporated into classroom activities.



Materials

Computer with Color Monitor
(4 MB RAM with System 7.0 or 2 MB RAM with System 6.07/6.08)
CD-ROM Drive
Just Grandma and Me (Brøderbund) CD-ROM
TouchWindow

Ahead of Time

Position the monitor on a low table with the keyboard and computer out of the child's visual field. To limit distractions, cover the pieces of equipment that are not being used by the child. Secure the TouchWindow on the monitor with Velcro. Position the monitor so it is within easy reach for the child.

Open the CD-ROM, *Just Grandma and Me*, and select the "Play" option. Under the Control Panel, select "TouchWindow" and calibrate the Window. Test the device with the program before the children use it.

Computer Activity

In a group activity, children take turns pressing an object or character on the screen. Talk about what they think will happen. After the children have explored a screen, ask them if they remember what a particular object did. Ask each child to pick a favorite one again to activate. The child can talk about why she thought that one was the best.

The children can listen to each page of the story, then explore the various objects and characters on each screen. Talk about what is happening in the story and on the screen. Encourage the child to pick an object on the screen and predict what it will do. Relate the scenes to experiences in the child's life. During free play, the children can explore the program independently.

Related Activity

Ask each child's family to send pictures of grandparents. Assist children in assembling a book about their grandparents which includes pictures, drawings, mementos, and experience stories. Children can share their books during a group activity.

Create a beach scene in the classroom with sand and water trays with accompanying toys. Encourage children to bring shells or other souvenirs from home which relate to the beach.

Invite grandparents to visit the classroom on a designated "beach" day. Have a picnic snack on the "beach."

Design a foam board as a beach background with various objects related to water and sand activities. Characters from the program can be captured and printed. Attach Velcro to all objects and characters so that the children can then play and create their own beach scenes.

Read other books in the class about grandparents. Discuss the different settings in the story and how they relate to Little Critter and his Grandma. Also discuss how the stories relate to the children's grandparents.

Curriculum Integration Ideas

Two main themes are present, grandparents, and the beach, which can be integrated into the curriculum. Create a beach environment in the room so children can experience and explore with all of their senses what it would be like to walk and play on a beach:

Environment

- Create a beach environment for the classroom with sand, birds, animals and fish
- Pack items to take to the beach including umbrella, kite, towel, sun lotion, food, drinks, and beach toys
- Play tape recordings of birds, whales, blowing wind, and ocean sounds
- Fill the manipulative table with sand and/or water
- Pretend to feel the sand between your toes, the wind blowing, and the hot sun on your skin

Emergent Literacy

- *Famous Seaweed Soup* (Martin, A.T.)
- *The Napping House* (Wood, A.)

Expressive Arts

- Create pictures about favorite things or events related to grandparents
- Draw a picture of what a child thinks he will look like as a grandparent
- Draw pictures of grandparents
- Dress-up as grandparents
- Play "house" with children being different family members including grandparents

Community

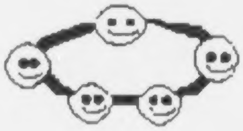
- Invite grandparents to visit on a designated day
- Encourage grandparents to volunteer to teach the children a special skill or demonstrate their hobby
- Take a field trip to one of the grandparents' houses or farms as invited
- Have grandparents share shells or other beach items with children

Summary

A computer program is the means by which a Mercer Mayer story comes alive for young children. By touching an object or character on the screen children can interact with the story. Experiences with grandparents can become part of the classroom activities by exploring the characters and objects in the program. Through creative environment design, the beach can be brought to the children to experience firsthand. The computer interaction sparks curiosity and awareness which can then be transferred to the child's environment. By adapting the program through use of touch tablets or switches, each child is ensured equal participation in the activities.

Story Time with Friends

Washing and cleaning are part of a child's every day experiences. *Storytime Tales*, "Bobby Bobby What Did You Do?," is a storybook program which contributes to a child's understanding of simple concepts such a clean and dirty, and wet and dry. Children are provided with a simple predictable story line in which the main character gets different parts of his body dirty and needs to "wash, wash, wash." Activities and discussions about the story may enhance language and cognitive skills. By answering the question *"What's Bobby going to do with his dirty face?,"* children can problem solve the situation. Children can examine and investigate Bobby's face to see how it changes from dirty to clean. They may compare each other's faces and talk about why their faces get dirty and how they get clean again.



Materials

Computer with System 7.0,
Color Monitor
Macintosh Microphone
Storytime Tales (DJD) "Bobby, Bobby What Did You Do?"
Discover:Kenx
Key Largo or Unicorn Expanded Keyboard
One Switch

Ahead of Time

Set up the program ahead of time by loading the communication setup. Attach the switch and Unicorn Expanded Keyboard or Key Largo to *Discover:Kenx*. Boot *Storytime Tales*, and select the story "Bobby, Bobby What Did You Do?" See Chapter 7.

Arrange the computer center so children can participate in this group story activity. If needed, demonstrate switch pressing to the children so they understand how and when to activate the switch. For example, press the switch when they hear the bell or press the switch when they see the green triangle on the screen.

Computer Activity

Arrange the switch for the child or children who need it. Let the children take turns. When one child is activating the switch, encourage the others to attend to the monitor. Talk about Bobby getting dirty and clean. Ask the child with the communication board questions such as, *"What happened to Bobby?" "Is Bobby dirty or clean?" "Whose turn is it?" "What does Bobby need to do?"*

Related Activity

Create a "Bobby" storybook. Capture each image of the story, "Bobby, Bobby." Print out the pages with a color printer or if using just black ink, color each page. Construct your own "Bobby" storybook for children to enjoy as part of their classroom library. The storybook can also be read to the children before, during or after the computer activity.

Create a communication apron or board for "Bobby." Construct a simple story apron from a low pile material such as "Tempo." Or create a story board from foam core board with the low pile material glued to it. Follow the storybook directions above to print images from the screen. Cut simple images from the story and make them sturdy by gluing cardboard or felt to the backs. Then, glue small pieces of female Velcro to the backs of each image. For the dirty "Bobby," color the Velcro and glue to the front of Bobby to represent dirt.

As a character is being introduced in the computer story, take the image off the apron or board and present the image to the child. The child may enjoy playing with the figure as the story continues. Encourage the child to talk about the figure and whether it is clean or dirty. These figures may help children with sequencing skills to visually or tactilely follow the story.

The apron or board can be used within the classroom to support language development in children's everyday activities. For more information about communication board and aprons. (See Appendix.)

Other Activities

Create a communication overlay such as the one described in *Storytime* in Chapter 7, *Customized Curriculum Activities*.

Provide each child with a washcloth so when the story says, "wash, wash, wash," each child can pretend to wash during this episode of the story. Make up a song about washing.

Encourage the child to wash a doll in a way similar to the way Bobby is washed. The child can relate Bobby's body to the doll's body and even his own body.

Curriculum Integration Ideas

Community

- Watch/help the family with the laundry drying clothes
- Put clothes away
- Take a trip to the Laundromat
- Help sort the clothes - light/dark
- Help wash clothes
- Play with pretend Laundromat
- Wash hands before snack time
- Wash hands after bathroom use
- Clean up spills during snack time

Emergent Literacy

- *Storytime* (King-DeBaun, P.)
- *Storytime! Just for Fun* (King-DeBaun, P.)
- *Story! Holiday Fun* (King-DeBaun, P.)

Science

- Play with water and soap
- Discuss water and its role in our environment
- Take field trip to the local water treatment plant
- Explore what happens when bubble bath is added to water

Self-Awareness

- Discuss bathing
- Reenact getting ready for school

Summary

A simple story about washing face, hands, arms, and tummy can be used as a vehicle for designing a variety of activities. By relating the concepts presented in the software to everyday experiences in the classroom and home, the technology becomes an integrated component in the preschool curriculum. Adaptations with input methods and overlays insure that every child in the classroom can participate equally in the activities.

Taking the Doggy Home Switch Activity

Most young children enjoy playing with a stuffed animals, especially ones which resemble pets, such as a dog. This simple switch activity with a battery-operated dog gives children a way to play with a toy dog while developing problem solving skills.

Materials

Battery-operated dog
Battery Interrupter
Switch
Timer
Dog house made out of a box

Ahead of Time

Ahead of time, make a dog house by cutting out one end of a box which is large enough to fit the battery-operated dog.

Talk about dogs and how some dogs have little houses of their own to sleep in. Read a simple story to the child about a dog in a dog house. Relate the dog in the story to the battery-operated dog. Encourage the child to physically explore and play with the dog. Show the child the dog's house and talk about how he wants to go into his house.

Procedures

Connect the toy to the battery-interrupter, an appropriate switch, and timer. Demonstrate how to make the dog move by pressing the switch and drawing the child's attention to the moving dog. With the timer, the toy will remain active for several seconds before stopping. This provides more time for the child to watch the dog's movement.

When the dog stops, encourage the child to press the switch to make the dog "go" again. Physical assistance may be needed if he is hesitant to press the switch initially. Encourage the child to continue to take the dog for a walk around the floor. Allow plenty of time to explore the toy's movement.

When the child is familiar with her own control of the toy's movement, encourage her to move the dog toward his house. If the dog is facing off target, reposition it so that it is easy for the child to see the dog moving directly toward the house. The child can continue moving the dog until he is in the house. Talk about the dog going to sleep as you disconnect the switch and end the activity.

Related Activity

Other battery-operated toys, such as a car or train, could be used with a problem solving activity of reaching a target, such as a garage or train station. Also, as the child progresses, remove the timer so that she is required to press the switch for each small movement of the dog. In this way, she will be able to control the dog's directed movement and may notice when the dog gets off track immediately.

Other Activities

If the problem solving activity is too difficult for a child, begin with the simple cause and effect activity of pressing the switch to move the dog in any direction on the floor. If the child tends to bang on the switch, demonstrate gentle pressing. Also some children may want to slap at the switch, in which case the toy probably will not activate. Again, demonstrating appropriate switch pressing should help.

Curriculum Integration Ideas

Emergent Literacy

- Read books about dogs and other pets
- Look at pictures of dogs and talk about how they compare to child's toy dog
- Compile a book of family pet pictures
- *The Quilt* (Jonas, A.)

Expressive Arts

- Draw pictures of dogs
- Pretend to be a dog
- Sing songs about dogs, "How Much Is That Doggie In The Window?," "B-I-N-G-O"

Summary

By adding a dog house and a goal to a simple switch and toy activity, a challenge has been added to an otherwise simple task. The design of the activity encourages the development of problem solving skills while providing the child a means of control.

The Return of Boz

Children develop important concepts of object permanence and causality at a very young age. Through the seeming "magic" of technology a little creature can appear and disappear right before the child's eyes. Exploring software and related activities leads to development of concepts relating to object permanence and causality.

Materials

Macintosh Computer with color monitor
Creature Antics (Laureate Learning Systems)
TouchWindow

Ahead of Time

Position the monitor so that it is easy to reach and to see for the child. Attach the TouchWindow to the monitor. Calibrate the TouchWindow in the Control Panel. Open the program, *Creature Antics*, and select "Boz."

Computer Activity

Begin by talking with the child about the character on the monitor and relate it to the doll or animal used for off-computer activity (See Related Activity below). Encourage the child to explore the TouchWindow by pressing on the monitor to see Boz jump and play.

Continue encouraging the child to press until Boz disappears. Ask the child what happened to the character and how to bring him back. If the child presses the monitor, verbally reinforce him by stating what happened in the picture. If the child does not press the monitor, demonstrate how to bring Boz back by pressing and drawing child's attention to the screen.

Encourage the child to talk about how he made the character disappear and reappear.

If the child is hesitant to touch the monitor or switch, demonstrate pressing for him. If he is still hesitant, physically assist him in pressing. For a child who has a tendency to bang on the TouchWindow, use a gentle reminder to touch gently.

Related Activity

Play a game with the child with a doll or stuffed animal which will fit inside of a shoebox. Dance the doll around and talk about it with the child. While the child is watching, make the doll disappear inside of a hole cut in the top of the shoebox. Ask the child where the object went and encourage her to look for it. If the child does not look for it, make it reappear.

Repeat the activity with the same doll and box, then change to a different doll or animal with the same box. As the child grasps the concept of object permanence, different objects and different size boxes could be used.

Other Activities

This software program can also be used with a switch. As the child presses the switch, draw his attention to the monitor to watch what the character is doing. Allow time for the child to explore the switch during the beginning of the activity. He may discover the sequence of events by accident. If so, encourage him to make it happen again.

Curriculum Integration Ideas

Emergent Literacy

- Make a book from pictures of Boz off of the screen
- Read a book which has a funny character like Boz
- Read a *Peek-A-Boo* Book
- *My Critters* (King-DeBaun, P.)

Expressive Arts

- Play peek-a-boo during dressing time
- Look at self in mirror

Self-Awareness

- Dress up as a funny character
- Jump and hop around like Boz
- Make up a silly song about Boz

Summary

A funny little creature, like Boz, can provide an enjoyable way for children to explore the appearance and disappearance of objects in their environment. Object permanence concepts are learned as a child's touch activates silly antics on the screen.

With the appropriate software and customization each child has the opportunity to make choices and participate in classroom routines. By making music and songs one of the choices, children are able to open up a whole new world of sounds which they may not have been able to control before.

"Today Is" ..... with the Touch Tablet

In many early childhood classroms calendar and weather are important topics in the children's daily routine. The adaptations in this activity insure that all children can participate in these circletime discussions.

Materials

Macintosh computer with color monitor
Discover:Kenx
Key Largo,
Color Printer/Paper

Ahead of Time

Make a set up with an overlay using *Discover:Kenx* as shown in *Customized Curriculum Activities*, page 123. Choices may include: child's name, rainy, sunny, cloudy, and today is.

Computer Activity

Place the overlay on the Key Largo. Name the object in each picture for the child. Have the child press each area on the Key Largo and listen to the computer name each object. Encourage the child to first press the picture of the child to say his/her name and then to indicate what the weather is like by pressing one of the other pictures. This overlay may take but a few minutes to use. If so, branch to another overlay (days of the week, sequence pattern, or what month is it) so the child can continue to talk during circle time.

Related Activity

This activity can be used to assist the teacher in evaluating how the child is able to access the touch tablet and how the child visually attends to the overlay and monitor.

Other Activities

To change the theme, replace the icons with different subject matter. Add texture or objects to theoverlay which relate to other choices, such as eat or drink. Artificial food attached with poster putty on the laminated overlay is one possibility. Use signs for "eat" and "drink" to ask the child what he/she wants. If speech amplification is needed, headphones or external speakers can be attached to the computer. Introduce other choices to the child off computer with two pictures or switches and battery-operated objects.

Use off-computer matching games to supplement computer activity. The child can match picture cards to picture cards and objects to objects. The matching game overlay could be used by the child to make requests. Additional three-item overlays of classroom objects can be made and used. Turn the classroom lights down low or off to help the child view and attend to the monitor.

Curriculum Integration Ideas

Emergent Literacy

- *The Snowy Day* (Keats, E.J.)

Expressive Arts

- Sing songs about days of week and weather
- Draw pictures related to rainy, cloudy, sunny days
- Play with puppets and talk about weather
- Pretend to be a flower or plant and act out how you feel when it's rainy, cloudy, or sunny

Math

- Mark on the calendar how many days are rainy, sunny, cloudy
- Make a weather chart

Science

- Observe the different clouds outside
- Make a tornado with two bottles and water

Summary

By using the computer as a communication board, all children can participate in circletime activities. The choices for overlays can branch into any classroom theme for the day or week.

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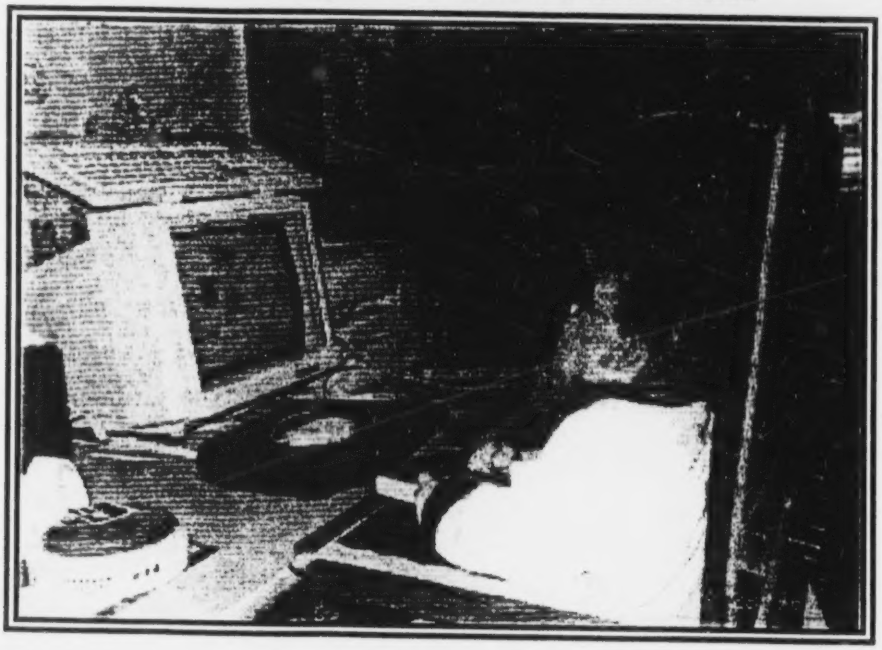
Chapter Seven

Customized Curriculum Activities



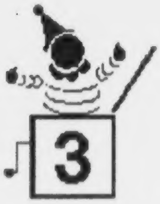
Overlay for ArtSpace

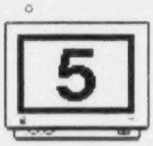
Open *Discover:Kenx Create*. Select "new" for Alternate Keyboard. Under the Options Menu select, "Sounds for Untitled-1." Click on "Add Sound." Record the following responses: *Adult Gallery*, *Children's Gallery*, *The Studio*, *my turn*, *thank you*, and *more* by clicking on "record" to start and "stop" to finish. The voice can be yours or a child's. Check your recorded sound by clicking on the speaker to hear it. When satisfied, click "Save" and give the sound a name. The sounds have been placed in the Digitized Sound Library for this specific overlay. Name and save your file.

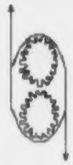
Set Markers: Place a clear transparency over the computer's monitor. Launch *ArtSpace*. Once in the lobby of the program, with an overhead projector pen, make a mark on the transparency, defining the selected hot spots: Adult Gallery, Children's Gallery, and the Studio. Markings could be either "X's" or "O's." Leave the transparency on the monitor. Quit *ArtSpace*. Go back to the opened *Discover:Kenx* file.

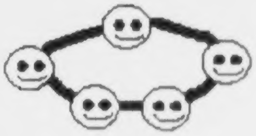
Select "Set Marker" in the *Discover:Kenx* Menu or use Open Apple M. Place a marker where you want it on the screen, (behind the first transparency mark) click, and name the marker with the number, "1." Continue doing this until all three selected "hot spots" have been given a number (1-3).

Define the Touch Tablet: Next create 6 squares for the overlay (See sample). Click and drag mouse pointer to the desired size. Double click on the first square. Under "User Hears" select "Digitized" and then click on "Sounds." Select a sound that was previously recorded and click "OK." Continue doing this until all selected squares have been given a sound.





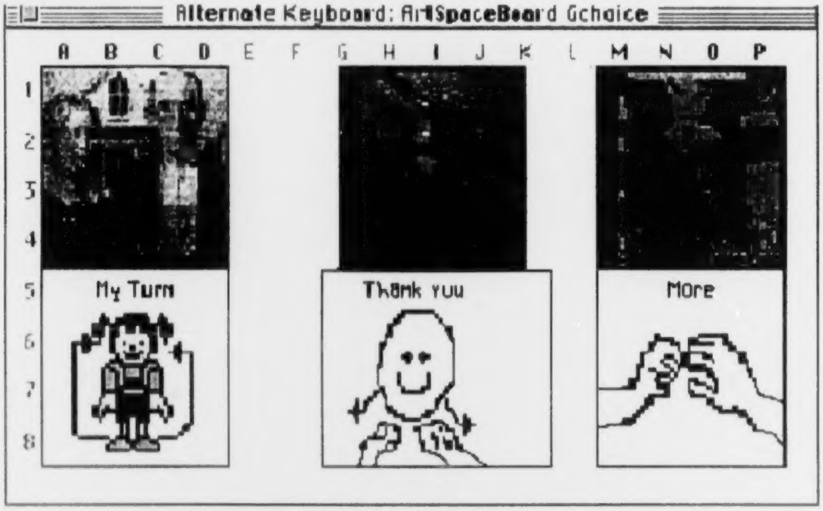




Ahead of Time

Create a *Discover:Kenx* communication overlay for *ArtSpace*. See the Appendix for instructions on how to capture an image from a software program. Suggestion: When capturing and modifying images from *ArtSpace*, be selective. Because of the complex and high resolution graphics, the simpler the image the better for importing into *Discover:Kenx*.

Create the overlay for Key Largo by using the captured screen images. Under "User Sees," graphics can be inserted to create the top three images from *ArtSpace*. Try not to label since it may interfere with the program and activity. The bottom three graphics can be created and labeled in the graphics portion of *Discover:Kenx* (See Sample).


Alternate Keyboard: ArtSpaceBoard Gchoice
A B C D E F G H I J K L M N O P
1 2 3 4 5 6 7 8
My Turn
Thank you
More

Sample Ke:nx Overlay for ArtSpace

Computer Receives:

Double click on the Adult Gallery icon.

Under "Computer Receives" enter:

<marker>1<click>
Click on done.
Double click on Children's Gallery's icon.

Under "Computer Receives" enter:

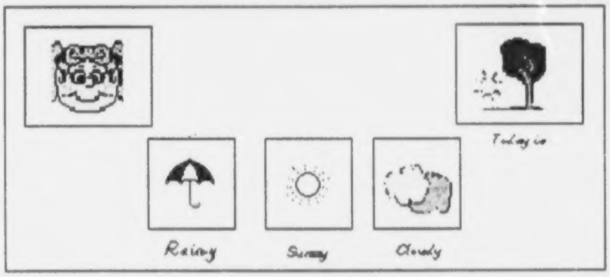
<marker>2<click>
Click on done.
Double click on the Studio icon.

Under "Computer Receives" enter:

<marker>3<click>
Click on done.

Save the setup. Under the *Discover:Kenx* Menu load this setup. Attach a Key Largo to *Discover:Kenx*. Test the overlay. Make any corrections if necessary. If overlay works, go back to the setup in *Discover:Kenx* Create. Print the overlay.

"Today Is" Overlay with the Touch Tablet



***Today Is* Overlay**

To create the overlay described in the activity, *Chapter Six*, page 119, using *Discover:Kenx*, designate five areas on the overlay for a touch tablet (Key Largo or Unicorn Expanded Keyboard). Double click on the first square.

- For the first square select the following:
  - **User Sees**: Select Graphic, Set Icon. In the *Discover:Kenx* Icon library find the appropriate symbol. Click OK.
  - **User Hears**: Select Digitized, Sounds, Add. Record the name of the child into the computer. Give the sound a name. Click on the name and select OK.
  - **Computer Receives**: Leave blank.
- Second square select the following:
  - **User Sees**: Select Graphic, Set Icon. In the *Discover:Kenx* Icon library find the appropriate symbol. Click OK.
  - **User Hears**: Select Digitized, Sounds, Add. Record, "*Today is....*" Give the sound a name. Click on the name and select OK.
  - **Computer Receives**: Leave blank.
- Third square select the following:
  - **User Sees**: Select Graphic, Set Icon. In the *Discover:Kenx* Icon library find the appropriate symbol. Click OK.
  - **User Hears**: Select Digitized, Sounds, Add. Record, "*Rainy.*" Give the sound a name. Click on the name and select OK.
  - **Computer Receives**: Leave blank.
- Fourth square select the following:
  - **User Sees**: Select Graphic, Set Icon. In the *Discover:Kenx* Icon library find the appropriate symbol. Click OK.
  - **User Hears**: Select Digitized, Sounds, Add. Record, "*Sunny.*" Give the sound a name. Click on the name and select OK.
  - **Computer Receives**: Leave blank.
- Fifth square select the following:
  - **User Sees**: Select Graphic, Set Icon. Make a new icon by choosing the Edit mode. Make two circles and fill them in with a gray color. Save, name, and Click OK.
  - **User Hears**: Select Digitized, Sounds, Add. Record , "*Cloudy.*" Give the sound a name. Click on the name and select OK.
  - **Computer Receives**: Leave blank.

Provide the overlay with a name and save. Print a color overlay. Laminate the overlay for durability. Load the setup before the child is brought to the computer center. Integrate the overlay during circletime discussions.

Just Grandma and Me

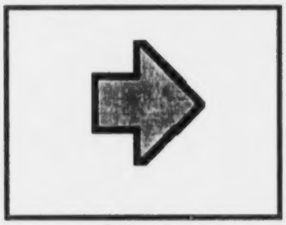
Levels of Touch Tablet Use

A progression of skills can be defined for young children who are beginning to use the Key Largo for computer access and who will eventually use the device for communication. At the first level, attending to the overlay and developing an understanding of causality are emphasized when the child presses an area on the overlay and causes something to happen. At the next level, an option is added to activate a random character or object on the screen. As the levels progress, the child is presented with more choices and more opportunities for interaction with the program. Through these overlays and activities the child begins to learn how to make choices and use the device to accomplish her desired goal. By mastering these skills, she will then be able to use the Key Largo or a similar touch tablet as a communication device. The child can indicate what she wants to eat or drink through customized picture overlays. These levels of touch tablet use also prepare a child for future use of more sophisticated communication devices, such as the Liberator.

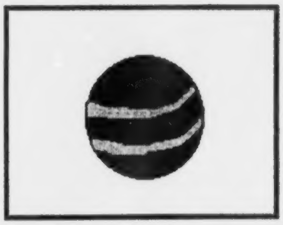
These levels of overlays are presented here to provide ideas for using a commercial software program, such as *Just Grandma and Me*[1] (Broderbund), with *Discover:Kenx*, and Key Largo to work on a progression of skills. Similar overlays and activities can be created using IntelliKeys and *Overlay Maker* (IntelliTools).

Just Grandma & Me
Overlay Levels

Level 1

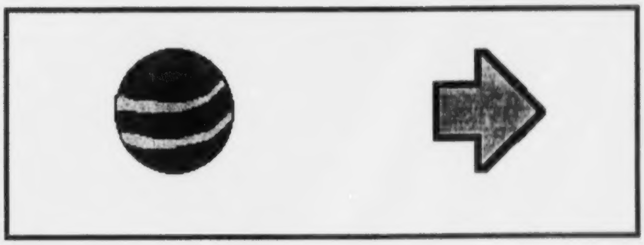


Option #1
Turn the page.



Option #2
Turn the page.

Level 2



Option #1
Read the story and turn the page.

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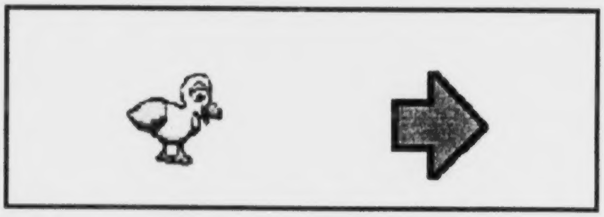
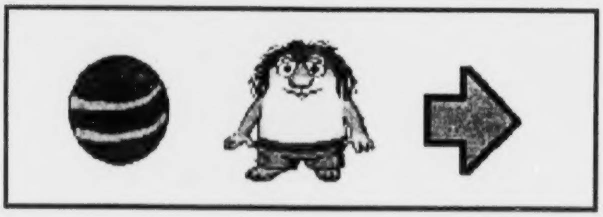
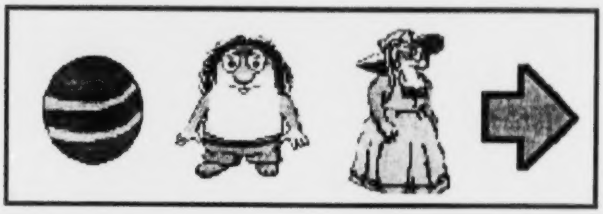
[1] *Just Grandma and Me* (Brøderbund). Graphics used with permission.



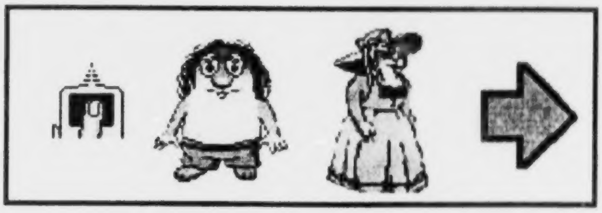
Level 2
Option #2
- Random hot spot
- Turn the page



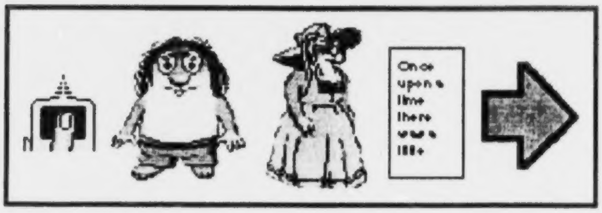
Level 3
- Read the page
- Critter hot spot
- Turn the page



Level 4
- Read the page
- Critter hot spot
- Grandma hot spot
- Turn the page



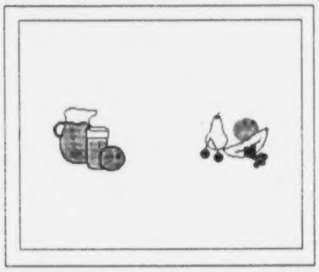
Level 5
- Click
- Critter hot spot
- Grandma hot spot
- Turn the page



Level 6
- Click
- Critter hot spot
- Grandma hot spot
- Read the page
- Turn the page

Communication Overlay

To create a communication overlay as described in the Snacks With a TouchWindow activity found in Chapter Six, use *Discover:Kenx* and open *Discover Create*. Select "On Screen" and "New." Click and drag the square in lower right corner of the window and enlarge the area to fit your screen. In the upper left corner, click and drag to define about half the space. Repeat this on the right side, defining the remaining area for the other half of a communication overlay. Double click on the first area you defined..



For the left area select the following:

User Sees: Select Graphic, Set Icon. In the *Discover:Kenx* Icon library find an appropriate symbol. Click OK.

User Hears: Select Digitized, Sounds, Add. Record the phrase or words. Give the sound a name. Click on the name and select OK.

Computer Receives: Leave blank.

For the right side, select the following:

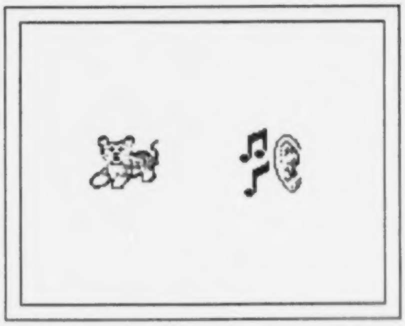
User Sees: Select Graphic, Set Icon. In the *Discover:Kenx* Icon library find the appropriate symbol. Click OK.

User Hears: Select Digitized, Sounds, Add. Record the phrase or words. Give the sound a name. Click on the name and select OK.

Computer Receives: Leave blank.

Save your set up. Print a color overlay. Laminate the overlay for durability. Load the setup before the child is brought to the computer center.

Create a scanning communication overlay for *Music and Sounds* (Chapter 6, page 98) as a switch activity. Use *Discover:Kenx* and open *Discover Create*. Select "Scanning" and "new." Click and drag the square in the lower right corner to decrease or enlarge the scanning screen size. Click and drag to place the array in position (upper, middle, or lower) on the screen. In the upper left corner, click and drag to define an area that is about half of the space. Repeat this on the right side, difining the remaining area for the other half of the scanning array. Double click on the left side.



For the left space select the following:

User Sees: Select Graphic, Set Icon, Add. Draw or use a simple image to represent a cat. Save, give it a name, and click OK.

User Hears: Select Digitized, Sounds, Add. Record a "Meow." Give the sound a name. Click on the name and select OK.

Computer Receives: Leave blank.

For the right side select the following:

User Sees: Select Graphic, Set Icon. In the *Discover:Kenx* Icon library find a music symbol. Click OK.

User Hears: Select Digitized, Sounds, Add. Record music activated from the Golden Book. Give the sound a name. Click on the name and select OK.

Computer Receives: Leave blank.

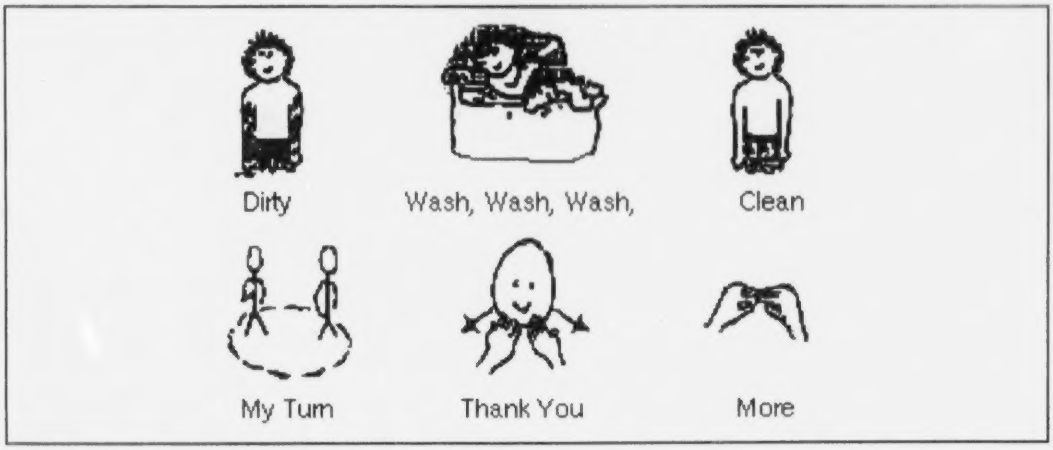
Save. Print a color overlay. Laminate the overlay for durability. Load the setup before the child is brought to the computer center.

Story Time

To create a communication overlay for the activity, *Storytime with Friends* (Chapter 6), launch *Discover:Kenx* and open *Discover: Kenx Create*. Select Alternate Keyboard and new. Under the Options Menu, select "Sounds for Untitled-1." Click on "Add Sound." Record the following responses: *dirty; wash, wash, wash; clean; my turn; thank you;* and *more* by clicking on "record" to start and "stop" to finish. This can be your voice or a child's voice. Check your recorded sound by clicking on the speaker to hear it. If you are satisfied with what you hear, click "Save" and give the sound a name. If not, re-record until you like what you hear. Your sounds have been placed in the Digitized Sound Library for this specific overlay.

Next create six squares for the overlay (See sample below). Click and drag mouse pointer to the desired size. Double click on the first square. Under "User Hears" select "Digitized" and then click on "Sounds." Select a recorded sound and click "OK." Continue doing this until all selected squares have been given a sound.

Create the overlay for the communication board by drawing or using images captured from the software program (see Appendix, *Capturing and Printing Images From Your Computer*).



Bobby 6 Choices

Under "User Sees," no graphics or labels will be created or selected because it will interfere with the program and activity. Save the setup and give it a name. Under the *Discover:Kenx* menu load this setup. Attach a Key Largo and a switch to jack #3 on the *Discover:Kenx* input box. Since this jack is designated as a click, this will allow you to use the Key Largo and a switch simultaneously. Start *Storytime Tales*. Under the User Level select "Press to turn page." Test the setup by randomly activating the touch tablet and switch.

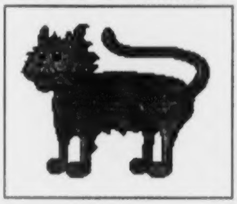
Creating An IntelliPics Overlay

Open the *IntelliPics* application, and select "New" under File. Enter the name of the Activity, such as "Pets."

Adding a Picture

Under Create, select Picture Item. Click on New and enter the name of the item, such as "cat."

Under Edit, select Picture Library. Click on the name of the item, such as "cat," which you would like to use as a picture. Click Copy, then select "Paste" from the Edit menu (or use the Command "V" keys) to paste the picture on the screen.



Adding Sound

Add sound by clicking on Sound.
Choose either:

1. Synthesized Sound—the computer "voice" says what you type, or
2. Digitized Sound—you record a word or phrase.

Adding Movement

Select Movement - then choose from a list of movements which appear on the screen.

Choose the speed of the movement.

Adding Other Options

Select Advanced to add any of the following features:

Caption - add words under the picture
Color
Count
Frame Animation
Icon
Scaling
Spoken Word
When all options have been selected for this first item, select Done.

Adding Other Items

Repeat the above procedures to add more items to your overlay.

Making Overlay

When all pictures have been created, select "Make Overlay" under File. Select the items you want to have on your overlay. If you want only pictures on the overlay and displayed on the screen, select only Picture Items from the list.

Printing the Overlay

Open *Overlay Maker* application. Under File select "Open" and find your newly created overlay. Your pictures should appear on the screen.

Place the pictures in the desired position by clicking on each picture and moving it. At this point other features in Overlay Maker may be used to finish the overlay. For example, frames may be added around each picture, or color may be added to the background of the overlay.

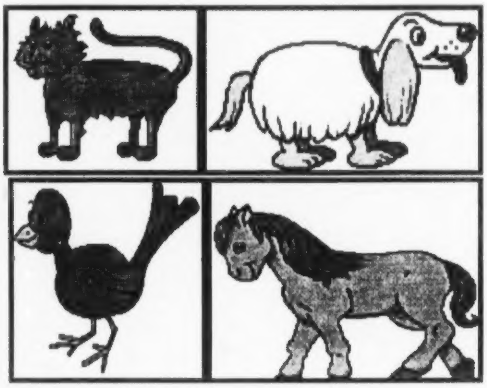
When all items are in the desired position, save your overlay and print it.

To print, select Page Set-up from the File menu and change the page orientation to horizontal and paper size to legal size. Insert 8x14 paper and print.

Using the Overlay

Open *IntelliPics* application and open your overlay file. Your picture items should appear on the screen. Place the overlay on the IntelliKeys and press the pictures for activation.

Note: To limit the number of items which appear on the screen, select Activity Preferences and click only the Pictures box. The screen will then display only the picture items.



Adaptations

Children who are not able to communicate verbally participate in discussions with an augmentative communication device. The device should be programmed with choices related to the software.

Children with hearing impairments should be encouraged to use signs to describe the program.

For children who have motor impairments, adaptive devices, such as the IntelliKeys, TouchWindow, Key Largo or a switch can be used as input. Activities may need to be customized with *Discover:Kenx* to insure equal participation of all children.

Motor Impairment

For a child with motor impairments, positioning of the child and the equipment is very important. Make sure that the child is in the optimal position for the activity. Parents, teacher and therapists should determine the best position and the child's most reliable movement.

Position the monitor at the child's eye level. This may mean moving the monitor off of the computer's CPU (Central Processing Unit) to sit on the table by itself.

If the child is unable to use the mouse, the TouchWindow may be used, or an alternate input, such as a switch or Key Largo could be set up with Ke:nx. The IntelliKeys could also be set up for use as a touch tablet or switch. Assess the child's ability to use an alternate input device. Make sure the input device is in a stable position and placed within easy reach for the child.

When using the TouchWindow, the monitor may need to be placed in a horizontal position or at an angle, if the child is unable to reach the screen in a vertical position. If the child is still unable to apply enough pressure to activate the device, another input method may need to be assessed.

If a touch tablet is being used, design overlays with large activation areas. If the child has difficulty pressing firmly enough to activate the touch tablet, adjust the sensitivity of the device if possible. Or try placing a small knob-like object (self sticking cushion feet) on each area of the the overlay to make it easier for the child to activate the desired choice.

If the child needs switch input, choose an appropriate switch to match the child's abilities. Secure the switch with tape, Dycem, a switch holder or switch mount. See Chapter 5 for information on types of switches and switch applications.

Auditory Impairment

Many early childhood educators are using sign language with all children during circle time and other classroom activities as part of a total communication approach. Signing can be used as a tool to increase interactions and enhance children's language abilities while they are young (Bahan & Dannis, 1990). When a teacher uses sign in the classroom, she is training the children to see the signs. In a computer activity, signing will begin to help the children use their eyes in a different way. Even though every child is not required to learn sign, introducing it as an early age will make all children feel comfortable with signs, so they can communicate with children who are deaf (Hafer & Wilson, 1990).

Use sign language with the child while he is operating a software program. Choose sign words which are interesting and familiar to young children (Bahan & Dannis, 1990). For example, when talking about the story, "Bobby, Bobby," in the program, *Storytime Tales*, use signs for descriptive words in the activity, such as "clean" and "dirty." The same signs which are used while talking about a software program, could also be used during other curriculum activities. Ask a child to use his own familiar signs to contribute to part of the story.

Provide visual reinforcement for the child through facial expressions after she has made an accomplishment in a software program. Use a total communication approach (signs and voice) when asking for a response.

When using a touch tablet for communication, present the signs for each object which appears on the overlay. If needed, assist the child in pressing a picture after an object is presented in order to help the child understand the purpose of the activity. When the child chooses a picture on the overlay, draw his attention to the picture or word on the monitor, then show him the sign for the word.

For amplified sound, attach headphones to the computer or monitor, depending on the model, or to an external speaker. Consult an audiologist to see if this is appropriate for the child. Sometimes increased volume can be more harmful than helpful. Children with severe loss of hearing may benefit from a program which concentrates more on visual stimulus rather than auditory.

Visual Impairment

For children with visual impairment, add textures to pictures on an IntelliKeys or Key Largo overlay to help the child identify each one. If possible have a similar shaped object available for the child to handle. Allow the child plenty of time to explore the overlay to find a specific picture.

Set up overlays so that specific requests or responses, such as Yes/No or Quit, are always in the same location. For example, "yes" is always in square 5 and "no" is always in square 6.

When using storybook programs, such as *Just Grandma and Me* or *Storytime Tales*, make a small version of a story board with a variety of thick cardboard figures representing the people and objects from the program. As the story progresses on the computer, encourage the child to feel the figures to find the appropriate one to stick on his story board. In this way he can "read" along with the rest of the children by feeling the figures in his book. A similar activity can be done with a communication apron (See *Appendix B*).

Use a textured book or one which contains Braille related to the content and screens in a computer program to help a child identify specific objects and characters. This book could be used off computer and even sent home to be shared with family members.

When using switches, attach textures to each switch to help the child locate the switch. This may also be helpful if the switches are used for communication. The textures could identify the request or item being activated by the switch.

Adjust lighting in the room to highlight the computer monitor for children with mild visual impairment.

To enlarge objects or text on the screen use Close View in the System software, or use a magnifying screen which attaches to the monitor. Also some children may benefit from a larger monitor. Many different models and size screens for monitors are on the market.

Distinctive sounds in programs may be used to help children participate in controlling a program. Children can benefit from the various voices, sounds, and music which can be heard in many software programs. Since recorded sounds are used as sound effects, it is easier for children to identify the sound with the real object.

A tactile overlay could be used with the TouchWindow for some programs. Programs, such as the *McGee* series, with distinct activation areas which remain the same from screen to screen, would be suitable. Use puffy paint to mark the activation areas on the overlay. For example, four large dots of paint could be used on the bottom part of the overlay for any of the *McGee* programs. Encourage the child to feel the dots and push to activate the program.

References for Chapter Seven

ArtSpace [Computer software]. (1996). Macomb, IL: Macomb Projects.

Bahan, B., & Dannis, J. (1990). *Signs for me*. San Diego, CA: DawnSignPress.

Bove, L. (1980). *Sign language fun*. New York: Random House/Children's Television Workshop.

Butterworth, R., & Flodin, M. (1989). *Signing made easy*. New York, NY: Putnam Publishing Group.

Circletime Tales [Computer software]. (1992). Wauconda, IL: Don Johnston, Inc.

Hafer, J., & Wilson, R. (1990). *Come sign with us*. Washington, DC: Clerc Books.

Hutinger, P., Betz, A., & Cunningham, L. (1996). *A curriculum to accompany ArtSpace*. Macomb, IL: Macomb Projects.

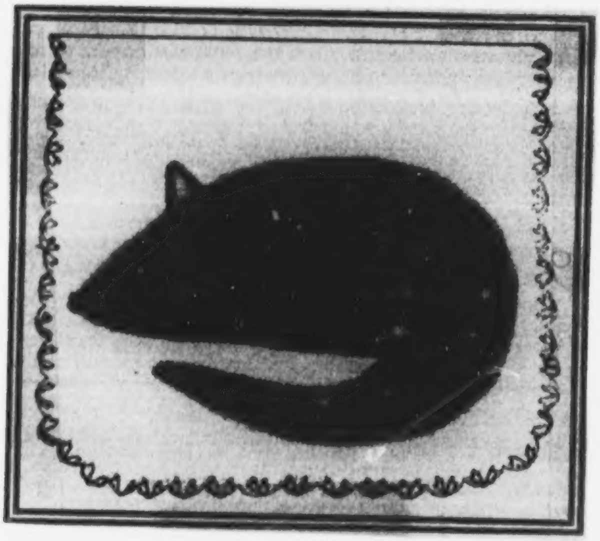
HyperStudio [Computer software]. (1993). El Cajon, CA: Roger Wagner Publishing, Inc.

Just Grandma and Me [Computer software]. (1992). Novato, CA: Brøderbund Software Inc.

Overlay Maker [Computer software]. (1992-96). Novato, CA: IntelliTools, Inc.

Storytime Tales [Computer software]. (1992). Wauconda, IL: Don Johnston, Inc.

Chapter Eight
Creative Corner



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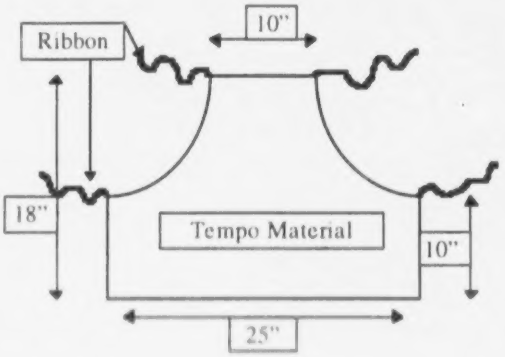
Creative Corner

Communication Apron

The dimensions for this communication apron are designed for the average preschool child. Dimensions can be increased or decreased depending on the size of the child or adult. Tempo material is recommended for the apron because of its durability, tendency not to pill, easy use of Velcro to attach or remove objects, easy care, and washability. Tempo Material is available in a variety of colors and can be purchased from Lockfast, Inc., 10904 Deerfield Road, P.O. Box 42488, Cincinnati, Ohio 45242, 800/543-7157.

Materials
Paper for making pattern
Ruler
Marker or pencil
18" x 25" Tempo Material -
Pins
Scissors
Ribbon
Velcro
Sewing Machine/Serger - optional



Procedures
1. Start with a 20" X 27" piece of paper. (Old newspaper can be pieced together to make the pattern.) With a marker/pencil and ruler, create the apron pattern by using the dimensions shown above.
2. Place and pin the pattern onto the fabric. Cut the apron from the Tempo fabric.
3. Because of Tempo's characteristics, the ends do not need to be finished. However, if desired, the ends can be finished with a Serger or sewing machine.
4. Cut 4 pieces of ribbon for the ties. Check for adjustments. Sew the ties to the neck and back area as shown in the drawing above.

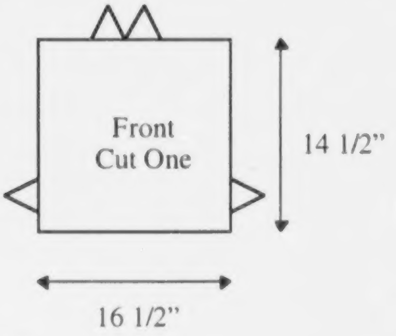
A variation of this apron can be easily made. Depending on the child's needs the apron can be made into a tie or vest.

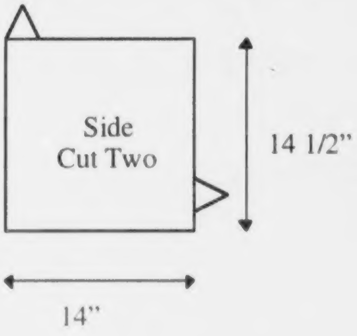
For icons or symbols for the communication apron, cut simple images from a story or theme and make them sturdy by gluing cardboard or felt to the backs. When working with small children, make the images large and simple for small hands. Then, glue small pieces of female Velcro to the backs of each image. For texture of the images, the male Velcro can be glued to the front of the images to represent texture such as dirt.

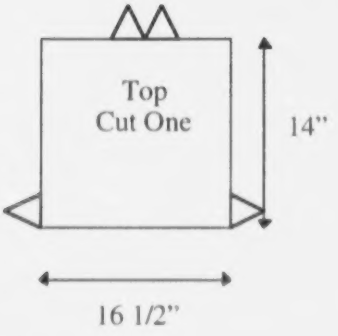
When using the communication apron, introduce the character or object by taking the image off the apron and present the image to the child. The child may enjoy playing with the figure as the activity continues. Encourage the child to talk about the image. Using a communication apron will assist a child with sequencing skills to visually or tactility follow a story. A communication apron can be easily integrated into any computer activity by capturing images from a software program for creating symbols.

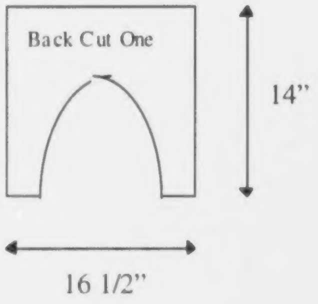
Computer Cover

A computer cover will protect the classroom's computer from dust and let children know in a non-threatening way that the computer is not to be used at that time. Most computer systems have a mouse. By providing a "mouse" pocket on the side of the computer cover, you are providing a safe place to store the mouse. The dimensions for this computer cover are designed for a 15" monitor. Dimensions can be increased or decreased depending on the size of the computer's monitor.









Materials

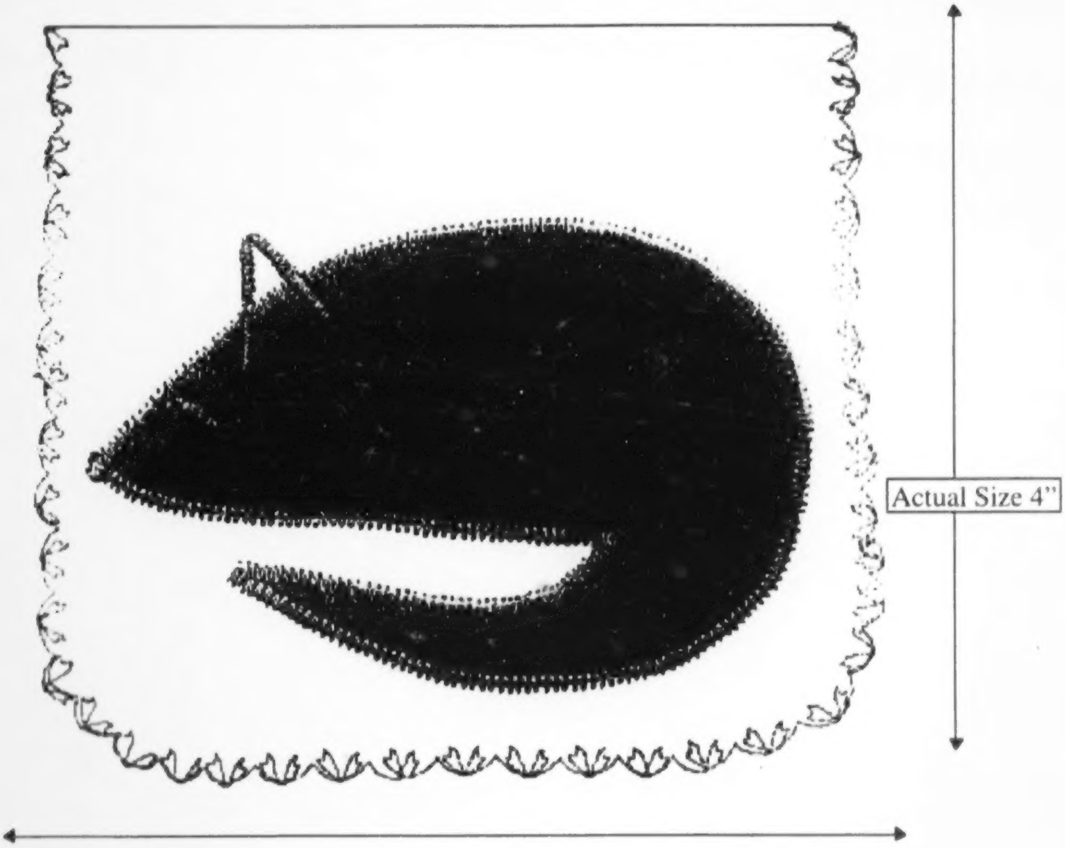
Paper for making pattern
Ruler
Marker or pencil
Approximately 1 to 1 1/2 yards. of quilted fabric
3 squares of felt
Pins
Scissors
Sewing /Serger Machine

Procedures

1. With a marker/pencil and ruler, enlarge the pattern pieces to size. Old newspapers work well for this.
2. Place and pin the pattern pieces onto the quilted material. Cut pattern pieces from the fabric.
3. Before sewing pieces together, machine appliqué the Happy Face to the front piece. Machine appliqué the mouse to the pocket piece. If you don't have the resources to appliqué the cover, try fabric glue or paper backed fusible web (*Wonder-Under* or *Stitch Witchery*) that turns any fabric into a fusible fabric. Craft paint can be used for the face features and "Z's."
4. Sew or glue the mouse pocket to the right side of the computer cover.
5. Match triangles and sew the computer cover.

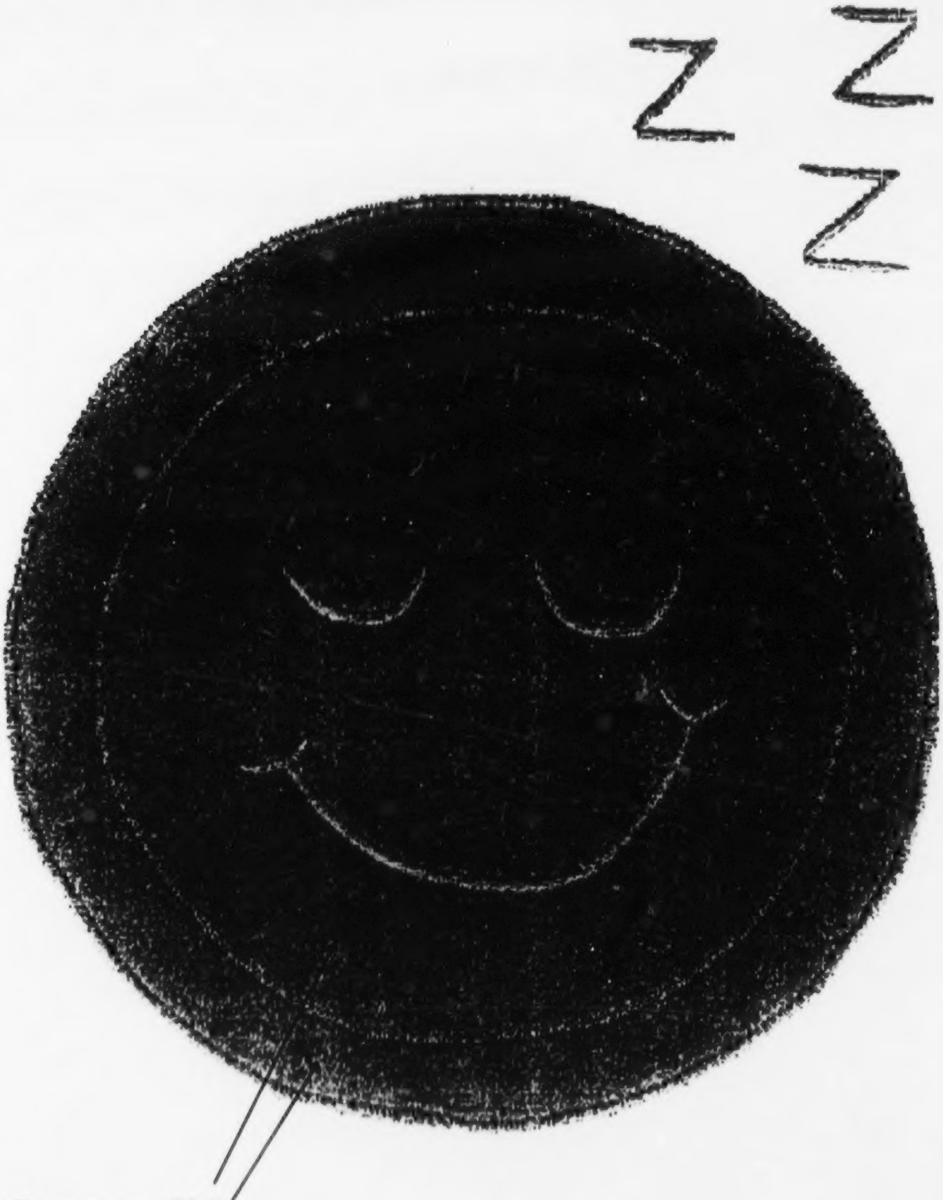
6. Finish the ends with a Serger or sewing machine.

Variations of the Happy Face can be made. Also, if you don't have the resources to sew a computer cover, use an old bedroom sheet. Have the children decorate the sheet (hand prints, paints, markers, etc.). When dry, the sheet can then be placed over the computer center when not in use. This also will keep the dust out of the computer center.



Actual Size 5"

Mouse Pocket
Cut Pocket 6" X 5" - This allows for 1/2" seams.



Different color of felt.

Pattern for Happy Face

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Bean Bags

Bean bags are fun to use in any birth to three or preschool program. Bean bags can be easily made from scrap material left over from the computer cover. To make them unique, you can capture an image from a favorite computer program and print the graphic using T-shirt transfer paper.

Materials

Scrap material from the computer cover
Felt material
Beans (or any type of filler for the bags)
Canon T-Shirt Transfer Paper (available from MacWarehouse)
Macintosh Computer system/Early Childhood Software
Color printer
Iron/Iron board

Procedures

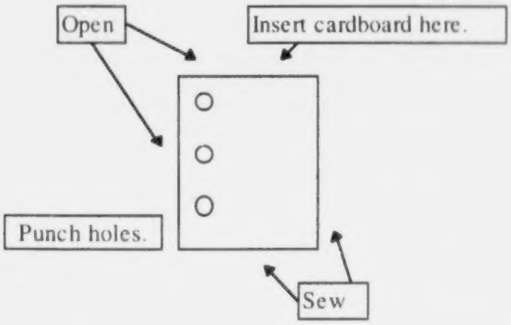
1. Cut squares of material that measure approximately 4 1/2" X 4 1/2".
2. Boot a software program from your computer system. To capture a symbol or icon from the program. On a Macintosh computer with System 7.1 or higher, press *Command-Shift-e*. You will actually hear a "click" similar to the sound a camera makes when it takes a picture. The captured image is saved as a "Picture" on the desktop. Each graphic file is named as "Picture 1," "Picture 2," and so on. The number of graphics you can capture depends on the memory availability of your computer. The graphic can then be opened in a program that handles graphics such as *ClarisWorks* (Claris Corporation). Remember, when using words (such as names), print the words backwards on the printer.
3. Print out the image with a color printer using T-Shirt Transfer Paper.
4. Place the transfer face down onto the material and press with the hot iron.
5. Sew three sides of the bean bag.
6. Fill the bag with beans.
7. Securely sew the fourth side of the bean bag.

Variations of the bean bag would include sewing a noise maker such as a plastic squeaker or electronic musical movement box inside the bag. A small amount of pressure would activate the plastic squeaker or music box. In this way the bean bags become great cause and effect toys for young children with physical disabilities.

Personalized T-Shirts

Personalized T-shirts can be made for the children in the classroom using the method described in *Bean Bags*. By either capturing an image from a software program, or using a photo from a QuickTake Camera, images from the classroom or favorite software program can easily be transfered to a T-shirt.

Communication Notebooks



Communication notebooks can be used in the classroom as a simple and easy to use tool for communication. Using the Tempo material, make a book cover for any size ring notebook. Cover a sturdy pieces of cardboard with Tempo material for inside pages. Punch holes into the fabric for the holes. Make several pages. Store symbols and Velcro figures in plastic inserts in the back of the notebook. Small versions of communication overlays and progress notes can also be kept in the notebook.

Appendix

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Levels of Switch Progression

Families and teachers often voice frustration over the fact that a child is not using his expensive augmentative communication device. There may be many reasons for this lack of use. One common cause for switch users is the inability to appropriately use a switch in order to communicate. We have found that there is a progression of skills needed before a child can use a switch effectively. The child cannot be expected to know how to scan pictures or words with a switch without proper training. After achieving causality, he must learn that there is an appropriate time to press his switch, and that specific switch pressing will result in communication. By starting with simple software programs, which at times seem like games, the child can master the skills needed to communicate with a device, such as the Liberator, or to do word processing functions through use of his switch.

There are many simple activities which can be done to teach or reinforce these switch skills. Over the past several years there has been an increase in the number of software programs designed to reinforce these skills. The following lists of skill levels were defined by Project ACTT. Some programs which have more than one activity on the disk help reinforce different switch skills and are, therefore, listed under more than one skill area.

Levels of Switch Progression
with Apple Software

Level 1: Simple Switch Input

One switch activation will repeat an action for beginning cause and effect.

Software	Company	Software	Company
Adapted Frog & Fly	*Public Domain*	*New Cause & Effect*	*Public Domain*
Build-A-Scene	*R.J. Cooper & Assoc.*	*Switch 'N See*	*Macomb Projects*
Creature Antics	*Laureate Learning Systems*	*Switch It - See It*	*UCLA Intervention Program*
Early & Advanced Switch Games	*R.J. Cooper & Assoc.*	*Switch It - Change It*	*UCLA Intervention Program*
Motor Training Games	*Don Johnston Inc.*		

Level 2: Two Switch Input

Each switch causes a different action.

Software	Company	Software	Company
Stickybear Opposites and AFC set up	*Optimum Resource*	*Peanut Picture Puzzlers* and AFC set up	*American School Publishers*

Level 3: Appropriate Time to Press Switch

Software presents child with auditory or visual cue. Child presses switch only after hearing or seeing cue.

Software	Company	Software	Company
Catch the Cow	*Computerade Products*	*Join the Circus*	*Don Johnston Inc.*
Children's Switch Progressions	*R.J. Cooper & Assoc.*	*Master Blaster*	*Macomb Projects*
Early & Advanced Switch Games	*R.J. Cooper & Assoc.*	*Make It Happen*	*Don Johnston Inc.*
First Words	*Laureate Learning Systems*	*Reactions*	*Don Johnston Inc.*
Switch Arcade	*UCLA Intervention Program*	*Scanning Game*	*Public Domain*

Level 4: Double Input Selection and Appropriate Time to Press Switch

Child presses switch to initiate action. After auditory or visual cue, child presses switch again for desired results.

Software	Company	Software	Company
Cats Switch	*Public Domain*	*Motor Training Games*	*Don Johnston Inc.*
Make It Scan	*Don Johnston Inc.*	*Run Rabbit Run*	*Exceptional Children's Software*
McGee and AFC set up	*Lawrence Productions*		

Level 5: Double Input Selection, Appropriate Time to Press Switch, and Object Placed in Specific Position

Child presses switch to initiate action. Child waits until specifically placed item is highlighted. Child presses switch a second time.

Software	Company	Software	Company
Catch the Cow	*Computerade Product*	*Make It In Time*	*Don Johnston Inc.*
Eensy Weensy Spider	*UCLA Intervention Program*	*Make It Scan*	*Don Johnston Inc.*
Learn to Scan	*Don Johnston Inc.*	*Rabbit Scanner*	*Exceptional Children's Software*

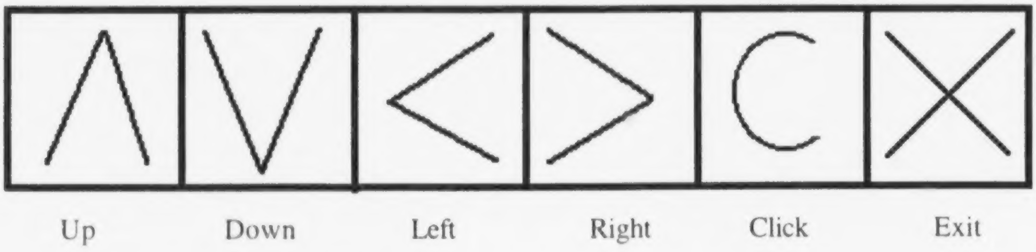
Level 6: Double Input Selection, Appropriate Time to Press Switch, Object Placed in Specific Position and Intent to Communicate

Child presses switch to initiate scan. Child selects desired item as it is highlighted. Child presses switch a second time to achieve intended outcome.

Programs, such as, *AFC Menu & Construction Disk* can be set up to use a scanning array with the Adaptive Firmware Card™. The child will scan the following array for ^ (cursor move up) **v** (cursor move down) **<** (cursor move left) **>** (cursor move right) **C** (Click) **X** (exit) with Explore-a-Story software. To access this array from your Apple computer, select the following from the *AFC Menu & Construction Disk*:

Expl-mouse 1-sw+ Explore-a-Story

See the figure below.



Levels of Switch Progression
with Macintosh Software

Level 1: Simple Switch Input

One switch activation will repeat an action for beginning cause and effect.

Software	Company
Switch Intro - Colors, Willy the Worm, Make It Sound (1 switch), Piece by Piece, Hidden Pictures, Jigsaw Pictures, Step by Step	Don Johnston Inc.
Circletime Tales	Don Johnston Inc.
Storytime Tales	Don Johnston Inc.
Press to Play Series	Don Johnston Inc.
The Rodeo - Let's Play	SoftTouch/kidTECH

Level 2: Two Switch Input

Each switch would cause a different action

Software	Company
Switch Intro- Make It Sound (2 switches)	Don Johnston Inc.
Games 2 Play - Select 1 Player, 2 Switches: Soccer, Rabbit Race, Treasure Island	Don Johnston Inc.

Level 3: Appropriate Time to Press Switch

Software presents child with auditory or visual cue. Child presses switch only after hearing or seeing cue.

Software	Company
Switch Intro - Start to Scan, Match Scan	Don Johnston Inc.
Hit'n Time - Balloons, Brickwall	Don Johnston Inc.
ToyStore - Color Box, Astroman, StoryTeller, Match-It, Shape Train	Don Johnston Inc.
aMAZEing Ways - Fire Engine, Maze, Fishing Boat	Don Johnston Inc.
The Rodeo	SoftTouch/kidTECH
Press to Play Series	Don Johnston Inc.

Level 4: Double Input Selection and Appropriate Time to Press Switch

Child presses switch to initiate action. After auditory or visual cue, child presses switch again for desired results.

Software	Company
Hit'n Time - Parachutist	Don Johnston Inc.
Workshop	Jokus

Level 5: Double Input Selection, Appropriate Time to Press Switch, and Object Placed in Specific Position

Child presses switch to initiate action. Child waits until specifically placed item is highlighted. Child presses switch a second time.

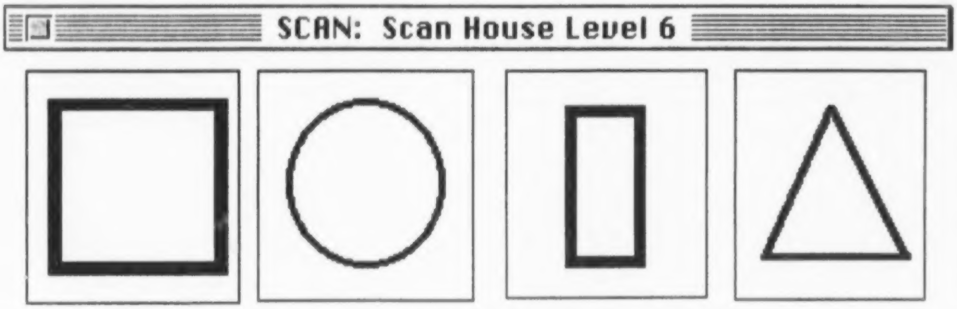
Software	Company
ToyStore - Remember It	Don Johnston Inc.
Camelephant	Don Johnston Inc.
Workshop	Jokus

aMAZEing Ways and **ToyStore** programs can be used at this level with two switches. One switch controls the scan movement, and the second switch controls the selection of the item.

Level 6: Double Input Selection, Appropriate Time to Press Switch, Object Placed in Specific Position and Intent to Communicate

Child presses switch to initiate scan. Child selects desired item as it is highlighted. Child presses switch a second time to achieve intended outcome.

This can be used with any program set up to use a scanning array with Discover Kenx™, Discover:Kenx™, or Discover:Switch™. For example: *Millie's Math House* (Edmark) with ACTT setup "Build A Mouse House" with *Discover:Kenx* file, **Scan House Level 6** Child presses switch to start scan of 4 boxes at bottom of screen. A second switch press then selects desired shape. See the figure below.



Computer Peripherals

Alternate Input Devices

Peripheral Name	Manufacturer Name & Address	Approximate Price[*]
Discover:Kenx	Don Johnston, Inc. P.O. Box 639 100 N. Rand Road, Bld. 115 Wauconda, IL 60084-0639 800/999-4660 or 847/526-2682	$780.00
Switch Interface	Don Johnston, Inc. See above	$135.00
TouchWindow™	EDMARK P.O. Box 97021 Redmond, WA 98073-3218 800/362-2890	$335.00
IntelliKeys™	IntelliTools, Inc. 55 Leveroni Court, Suite 9 Novato, CA 94949 800/899-6687 or 415/382-5959	$395.00
The following require connection to Discover:Kenx		
Multiple Switch Box	Don Johnston, Inc. See above	$68.00
Key Largo®	Don Johnston, Inc. See above	$295.00

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[*] Prices are approximate and may vary from dealer from dealer.

Technology Assistance Projects

National Projects

http://www.ucpa.org/html/innovative/atfsc/index.html
Assistive Technology Funding and Systems Change (ATFSC)
United Cerebral Palsy Associations, Inc.
Community Services Division
1660 L Street NW, Suite 700
Washington, DC 20036-5602

http://www.rt66.com/catn.org/
Consumer Assistive Technology Transfer Network (CATN)
Career Services for Persons with Disabilities
211 West Water Street, Suite 209
Santa Fe, NM 87501

http://www.resna.org/resna/hometa1.htm
Technical Assistance Project
RESNA
1700 N. Moore Street, Suite 1540
Arlington, VA 22209-1903

State Projects

http://www.mindspring.com/~alstar/
Alabama STAR: Statewide Technology Access and Response System for Alabamians with
Disabilities
Alabama Department of Rehabilitation Services
P.O. Box 20752
Montgomery, AL 36120-0752

http://www.corecom.net/ATA/
Alaska Assistive Technology Project
Department of Education/Division of Vocational Rehabilitation
2217 East Tudor Road, Suite 5
Anchorage, AK 99503

http://www.nau.edu/~ihd/aztap.html
Arizona Technology Access Program (AzTAP)
Northern Arizona University
2600 N. Wyatt Drive
Tucson, AZ 85712

http://www.arkansas-ican.org/
Arkansas ICAN (Increasing Capabilities Access Network)
Arkansas Rehabilitation Services
2201 Brookwood Drive, Suite 117
Little Rock, AR 72202

http://www.catsca.com/
California Assistive Technology System (CATS)
Department of Rehabilitation
Independent Living and Assistive Technology Division
830 K Street
Sacramento, CA 95814

http://www.ucc.uconn.edu/~techact/
Connecticut Tech Act Project (CTTAP)
Connecticut Department of Social Services
Bureau of Rehabilitation Services
10 Griffin Road North
Windsor, CT 06095

http://www.asel.udel.edu/
Delaware Assistive Technology Initiative (DATI)
University of Delaware/Alfred I. duPont Institute
Applied Sciences and Engineering Laboratories
P.O. Box 269
Wilmington, DE 19899-0269

http://www.cdd.sc.edu/dcpat.htm
District of Columbia Partnership for Assistive Technology (DCPAT)
District of Columbia Department of Human Services
National Rehabilitation Hospital
Rehabilitation Engineering Department
801 Pennsylvania Avenue SE, Suite 210
Washington, DC 20003

http://pegasus.cc.ucf.edu/~faast/
Florida Alliance for Assistive Services and Technology (FAAST)
Florida Department of Labor and Employment Security
Division of Vocational Rehabilitation
2002 Old St. Augustine Road, Building A
Tallahassee, FL 32399-0696

http://www.gatfl.org/
Georgia Assistive Technology Program - Tools for Life
Georgia Department of Human Resources
Division of Rehabilitation Services
2 Peachtree Street NW, Suite 23-411
Atlanta, GA 30303-3166

http://uog2.uog.edu/uap/gsat.html
Guam System for Assistive Technology
University of Guam
University Affiliated Program on Developmental Disabilities
UOG Station, House No. 12
Mangilao, GU 96923

http://www.ets.uidaho.edu/icdd/
Idaho Assistive Technology Project (IATP)
University of Idaho
Idaho Center on Developmental Disabilities
129 W. Third Street, Professional Building
Moscow, ID 83843-4401

http://www.q-com.com/iatp/
Illinois Assistive Technology Project
Illinois Department of Rehabilitation Services
528 South 5th Street, Suite 100
Springfield, IL 62701-1822

http://www.uiowa.edu/infotech/
Iowa Program for Assistive Technology (IPAT)
University of Iowa
University Affiliated Program
University Hospital School, Room 217
Iowa City, IA 52242

http://www.lsi.ukans.edu/lsi/athp.htm
(Kansas) Assistive Technology for Kansans
University of Kansas-Parsons, UAP
Parsons Assistive Technology Center
2601 Gabriel, P.O. Box 738
Parsons, KS 67357

http://www.katsnet.org/
Kentucky Assistive Technology Service Network (KATS)
Kentucky Department for the Blind/KATS Coordinating Center
Charles McDowell Center
8412 Westport Road
Louisville, KY 40242

http://www.mdtap.org/
Maryland Technology Assistance Program (MDTAP)
Governor's Office for Individuals with Disabilities
Box 10, One Market Center
300 West Lexington Street
Baltimore, MD 21201

http://www.matp.org/
Massachusetts Assistive Technology Partnership Center (MATP Center)
Massachusetts Commission for the Deaf and Hard of Hearing
Children's Hospital, Boston
1295 Boylston Street, Suite 310
Boston, MA 02215

http://www.mrs.mjc.state.mi.us/acc/tech2000/
Michigan's Assistive Technology Project: TECH 2000
Michigan Jobs Commission - Rehabilitation Services
3815 West St. Joseph Highway
Lansing, MI 48917-3623

http://www.state.mn.us/ebranch/admin/assistivetechnology.html
(Minnesota) System of Technology to Achieve Results (STAR)
Governor's Advisory Council on Technology for People with Disabilities
300 Centennial Building
658 Cedar Street
St. Paul, MN 55155

http://www.nde.state.ne.us/ATP/TECHome.html
Nebraska Assistive Technology Project
Nebraska Department of Education
Division of Vocational Rehabilitation
301 Centennial Mall South
P.O. Box 94987
Lincoln, NE 68509-4987

http://www.iod.unh.edu/projects/spd.htm
(New Hampshire) Supporting People with Disabilities through New Hampshire's Technology
Partnership
UNH/Institute on Disability
10 Ferry Street, Suite 307, Unit 14
Concord, NH 03301-5019

http://www.rt66.com/catn.org/
New Mexico Technology-Related Assistance
Program (NMTAP)
State Department of Education
Division of Vocational Rehabilitation
435 Saint Michaels Drive, Building D
Santa Fe, NM 87505

http://www.state.ny.us/disabledAdvocate/
(New York) Technology Related Assistance
for Individuals with Disabilities (TRAID)
New York State Office of Advocate for
Persons with Disabilities
One Empire State Plaza, Suite 1001
Albany, NY 12223-1150

http://www.mindspring.com/~ncatp/
North Carolina Assistive Technology Project
North Carolina Department of Human
Resources
Division of Vocational Rehabilitation Services
1110 Navaho Drive, Suite 101
Raleigh, NC 27609

http://www.ndipat.org/
(North Dakota) Interagency Program for
Assistive Technology (IPAT)
North Dakota Office of Vocational
Rehabilitation
Department of Human Services
P.O. Box 743
Cavalier, ND 58220

http://train.ovl.osc.edu/
Ohio TRAIN: Technology-Related Assistance
Information Network
Ohio State University, Super Computer Center
1224 Kinnear Road
Columbus, OH 43212-1163

http://www.okstate.edu/wellness/at-home.htm
Oklahoma ABLE Tech Assistive Technology
Project
Oklahoma State University, Wellness Center
1514 W. Hall of Fame
Stillwater, OK 74078-2026

http://www.ors.state.ri.us/
Rhode Island Assistive Technology Access
Partnership (ATAP)
Rhode Island Department of Human Services
Office of Rehabilitation Services
40 Fountain Street
Providence, RI 02903-1898

http://www.cdd.sc.edu/resweb/scatp.htm
South Carolina Assistive Technology Program
South Carolina Rehabilitation Department
1410-C Boston Avenue, P.O. Box 15
West Columbia, SC 29171-0015

http://www.tie.net/dakotalink/
South Dakota Assistive Technology Project
(DakotaLink)
South Dakota Department of Human Services
Division of Rehabilitation Services
Black Hills Special Services Cooperative
1925 Plaza Blvd.
Rapid City, SD 57702

http://www.state.tn.us/mental/ttap.html
Tennessee Technology Access Project (TTAP)
Department of Mental Health and Mental
Retardation
Gateway Plaza, 11th Floor
710 James Robertson Parkway
Nashville, TN 37243-0381

http://www.edb.utexas.edu/coe/depts/sped/TATP/TATP.html
Texas Assistive Technology Partnership
(TATP)
The University of Texas at Austin
Texas UAP/Department of Special Education
SZB Room 306, D5300
Austin, TX 78712-1290

http://www.uvm.edu/~uapvt/cats.html
Vermont Assistive Technology Project
Vermont Department of Aging and Disabilities
103 S. Main Street
Waterbury, VT 05671-2305

http://www.vcu.edu/rrtcweb/Vats/vatsview.html
Virginia Assistive Technology System (VATS)
Virginia Department of Rehabilitative
Services
8004 Franklin Farms Drive
Richmond, VA 23288-0300

http://weber.u.washington.edu/~atrc/
Washington Assistive Technology Alliance
(WATA)
Washington Division of Vocational
Rehabilitation
University of Washington, Assistive
Technology Resource Center
Box 357920
Seattle, WA 98195-7920

http://www.wvu.edu/~uacdd/wvat.htm
West Virginia Assistive Technology System (WVATS)
West Virginia Division of Rehabilitation Services
West Virginia University Affiliated Center for Developmental Disabilities
955 Hartman Run Road
Morgantown, WV 26505

http://www.uwyo.edu/hs/wind/wynot/wynot.htm
Wyoming New Options in Technology (WYNOT)
Wyoming Division of Vocational Rehabilitation
University of Wyoming's Disability Support Services
WYNOT Resource Center
2020 Grand Avenue, Suite 430
Laramie, WY 82070

Software Publisher Resource List

Abracadata, Ltd.
P.O. Box 2440
Eugene, OR 97402
503/342-3030
800/451-4871

Activision
11601 Wilshire Blvd., Ste. 300, 10th floor
Los Angeles, CA 90025
310/473-9200

American Eagle Computer Products
P.O. Box 46080
Chicago, IL 60646
773/792-1227

Brøderbund
500 Redwood Blvd.
Box 6121
Novato, CA 94948 - 6121
800-521-6263
FAX: 415-382-4419
E-mail: lucinda-ray@broder.com

Claris Corporation
5201 Patrick Henry Drive
or P.O. Box 58168
Santa Clara, CA 95054-1171
408-727-8227

Communication Enhancement Center
The Children's Hospital
300 Longwood Avenue
Boston, MA 02115
617/355-6486

Compu-Teach Inc.
16541 Redmond Way, Ste. 137C
Redmond, WA 98052-4482
206/885-0517
800/448-3224
E-mail: cmpteach@wolfe.net.com

Cross Educational Software
508 E. Kentucky Avenue
P.O. Box 1536
Ruston, LA 71270
318/255-8921
800/768-1969

Data Command, Inc.
119 S. Schuyler Avenue
P.O. Box 548
Kankakee, IL 60901
800/528-7390

D.C. Heath
2700 N. Richardt Ave.
Indianapolis, IN 46219
800/334-3284

Don Johnston Incorporated
P.O. Box 639
1000 N. Rand Road, Bldg. 115
Wauconda, IL 60084-0639
800/999-4660 or 847-526-2682
E-mail: DJDE@aol.com

Dr. Peet's Software
4241 Aldrich Ave. S.
Minneapolis, MN 55409
FAX/Voice orders 800-354-2950

Dunamis
3423 Fowler Blvd.
Lawrenceville, GA 30244
800/828-2443
E-mail: dunamis@aol.com

Dynacomp, Inc.
2935 E. Lake Road
Livonia, NY 14487
716/346-9788

Educational Resources
1550 Executive Drive
Elgin, IL 60123
708/888-8300 (IL)
800/624-2926

Edmark
P.O. Box 97021
Redmond, WA 98073 - 9721
800-362-2890
FAX: 206-556-8430

Electronic Arts
1450 Fashion Island Blvd.
San Mateo, CA 94404
800/247-1380

Exceptional Children's Software
2215 Ohio
Lawrence, KS 66046
913/832-1850

Great Wave Software
5353 Scotts Valley Drive
Scotts Valley, CA 95066
408-438-1990
FAX: 408-438-7171

Hartley Courseware, Inc.
9920 Pacific Hts. Blvd.
Suite 500
San Diego, CA 92121-4330
800/247-1380

Houghton Mifflin School Division
222 Berkely
Boston, MA 02116-3764
800/758-6762
E-mail: katie...kennedy@hmco.co

IntelliTools, Inc.
55 Leveroni Court, Suite 9
Novato, CA 94949
800/899-6687
FAX: 415-382-5950
E-mail: info@intellitools.com

K-12 MicroMedia Publishing
16 McKee Drive
Mahwah, NJ 07430
800/292-1997
E-mail: k12mmp@aol.com

Krell Software
Box 1252
Lake Grove, NY 11755
800/245-7355

Laureate Learning Systems, Inc.
110 East Spring Street
Winooski, VT 05404-1837
800/562-6801
E-mail: Laureate@LLSys.com

Lawrence Productions
1800 South 35th St.
Galesburg, MI 49053-9687
800-421-4157

The Learning Company
6493 Kaiser Drive
Fremont, CA 94555
800-227-5609
E-mail: spena@learningco.com

Learning Services
P.O. Box 10636
Eugene, OR 97440-2636
800/877-3278 or 800/877-9378

Macomb Projects
Western Illinois University
27 Horrabin Hall, 1 University Circle
Macomb, IL 61455
309/298-1634
Web site:http://www.mprojects.wiu.edu

Marblesoft
12301 Central Avenue N.E., Ste. 205
Blaine, MN 55434
612/755-1402
E-mail: mail@marblesoft.com

Minnesota Educational Computing Corp.
MECC
6160 Summit Drive North
Minneapolis, MN 55430 - 4003
612-569-1500
800/685-6322
FAX: 612-569-1551

Optimum Resources, Inc.
5 Hiltec Lane
Hilton Head Island, SC 29925
800-689-8000
803-785-7441
E-mail: stickyb@stickybear.com

Orange Cherry Software
P.O. Box 390
Pound Ridge, NY 10576-0390
800/672-6002

Queue, Inc.
338 Commerce Drive
Fairfield, CT 06430
800/232-2224
E-mail: Queueinc@aol.com

R.J. Cooper & Associates
24843 Del Prado, Suite 283
Dana Point, CA 92629
714/240-4853
800/RJ-Cooper
E-mail: rj@rjcooper.com

Roger Wagner Publishing, Inc.
1050 Pioneer Way, Stuite P
El Cajon, CA 92020
800/421-6526
E-mail: rwagnerinc@aol.com

Scholastic Software
555 Broadway
New York, NY 10012
800/724-6527
E-mail: atteichert@scholastic.com

Sierra On-Line
3380 146th Place SE
Suite 300
Bellevue, WA 98007
206/649-9800
E-mail: eddie.ranchigoda@sierra.com

Sunburst
101 Castleton Street
Pleasantville, NY 10570
800/628-8897
E-mail: sunburst4@aol.com

Terrapin Software Inc.
10 Holworthy Street
Cambridge, MA 02138
800/972-8200

Trace R & D Center
University of Wisconsin - Madison
S-151 Waisman Center
1500 Highland Avenue
Madison, WI 53705
608-263-2309

UCLA/LAUSD
UCLA Intervention Program
1000 Veteran's Avenue, Room 23-10
Los Angeles, CA 90095
310-825-4821
E-mail: twebb@pediatrics.medscho.ucla.edu

William K. Bradford Publishing
16 Craig Road
Acton, MA 01720
800/421-2009
FAX: 508-263-9375
E-mail: wkb@wkbradford.com

Suggested Software for Young Children

TOUCHWINDOW/MOUSE

- Bailey's Book House (Edmark)
- Blocks in Motion (Don Johnston Inc.)
- Circletime Tales (Don Johnston Inc.) switch, TW, mouse, or keyboard
- EA*Kids Art Center (EA Kids)
- Explore-A-Story Series (William K. Bradford)
  - Bald Headed Chicken, Princess and the Pea, Rosie the Counting Rabbit, Stone Soup, Three Little Pigs, & What Makes a Dinosaur Sore?
- KidPix (Broderbund)
- KidPix Companion (Broderbund)
- McGee Series (Lawrence Productions)
  - McGee, McGee at the Fun Fair, & McGee Visits Katie's Farm
- Millie's Math House (Edmark)
- Playroom (Broderbund)
- RadSounds (R.J. Cooper & Assoc.)
- Storytime Tales (Don Johnston Inc.) - switch, TW, mouse, or keyboard
- Storybook Weaver Deluxe (MECC)
- The Backyard (Broderbund)
- Thinkin' Things (Edmark)

INTELLIKEYS

- Buddy's Body (UCLA/LAUSD Microcomputer Project)
- Click It! (IntelliTools)
- IntelliPics (IntelliTools)
- IntelliTalk for the Macintosh (IntelliTools)
- Old MacDonald's Farm I (UCLA/LAUSD Microcomputer Project)
- Paper Dolls - Dress Me First (UCLA/LAUSD Microcomputer Project)
- Seek and Find (UCLA/LAUSD Microcomputer Project)
- This is the Way We Wash Our Face (UCLA/LAUSD Microcomputer Project)
- Wheels on the Bus, I, II, & III (UCLA/LAUSD Microcomputer Project)
- Zoo Time (UCLA/LAUSD Microcomputer Project)
- Instant Overlays (IntelliTools):
  - Arthur's Birthday
  - Bailey's Book House
  - Harry & Haunted House
  - Just Grandma & Me
  - Millie's Math House
  - Sammy's Science House
  - Thinkin' Things
  - Tortoise & Hare

KEYBOARD/MOUSE

- Dr. Peet's Picture Writer (Dr. Peet's Software)
- KidPix (Broderbund)
- KidPix Companion (Broderbund)
- Kid Works 2 (Davidson)
- Muppet on Stage (Sunburst)

KE:NX

- Ke:nx Ready - Setups/Write:Outloud (Don Johnston Inc.)
- Ke:nx Ready-Setups/JOKUS (Don Johnston Inc.)
- Ke:nx Ready-Setups/Storytime Tales (Don Johnston Inc.)
- Ke:nx Ready-Setups/ Circletime Tales (Don Johnston Inc.)
- Millie's Math House Setups (Macomb Projects)
- Easy Overlays [=] and Easy Scans [+] (DJD) for:
  - Arthur's Teacher Troubles +
  - Bailey's Book House = +
  - Berenstain Bears +
  - Dr. Seuss' ABCs +
  - Harry & Haunted House = +
  - Just Grandma & Me +
  - Kid Pix 2 =
  - McGee Series = +
  - Millie's Math House = +
  - Sammy's Science House = +
  - The Playroom = +
  - The Writing Center = +
  - Thinkin' Things Collection = +
  - Tortoise & Hare = +

SWITCH

- aMAZEing Ways (JOKUS-Don Johnston Inc.)
- Camelephant (JOKUS-Don Johnston Inc.)
- Circletime Tales (Don Johnston Inc.) switch, TW, mouse, or keyboard
- Cross Scanner (R.J. Cooper & Assoc.)
- Forgetful & Friends (Don Johnston Inc.)
- Games 2 Play (JOKUS - Don Johnston Inc.)
- Hit 'N Time (JOKUS - Don Johnston Inc.)
- Millie's Math House (Edmark)
- New Frog & Fly (Simtech Publications)
- One Switch Picasso (Simtech Publications)
- Press to Play Series (Don Johnston Inc.)
- RadSounds (R.J. Cooper & Assoc.)
- Sammy Science House (Edmark)
- Scan & Match #1 (Simtech Publications)
- Scan & Match #2 (Simtech Publications
- Scanning Picasso (Simtech Publications)
- Storytime Tales (Don Johnston Inc.) - switch, TW, mouse, or kybd
- Switch Intro (JOKUS - Don Johnston Inc.)

SWITCH continued

The Rodeo (Soft Touch)
Thinkin' Things Collection (Edmark)
Toy Store (JOKUS - Don Johnston Inc.)
101 Animations (R.J. Cooper & Assoc.)

OTHER PROGRAMS

ClarisWorks (Claris Corp.)
Hyper Studio (Roger Wagner)
Kid Desk (Edmark - Ed. Resources)
Print Shop (Broderbund)
Print Shop Deluxe (Broderbund)
Typestyler (Broderbund)
Write:Outloud (Don Johnston Inc.

CD-ROMs

Arthur's Teacher Troubles (Living Books)
ArtSpace (Macomb Projects)
Cosmic Osmo® (Cyan-Cosmic Osmo)
Discis Series (Discis)
  A Long Hard Day on the Rancy
  Cinderella
  Heather Hits Her First Home Run
  Moving Gives Me A Stomach Ache
  Mud Puddles
  The Paper Bag Princess
  Scary Poems
  The Tale of Benjamin Benny
  The Tale of Peter Rabbit
  Thomas' Snowsuit
Green Eggs and Ham (Living Books)
How Many Bugs in the Box (Simon & Schuster)
Imo and the King (Davidson & Associates)
Just Grandma and Me (Living Books)
Little Monster Goes to School (Educational Resources)
Mr. Potato Head (Playskool)
Pippi (ahead media AB)
Ruff's Bone (Living Books)
Sammy's Science House (Edmark)
Sheila Rae, the Brave (Living Books)
Silly Noisy House (Educational Resources)
Stellaluna (Living Books)
Thinkin' Things 2 (Edmark)
Workshop (Don Johnston Incorp.)

CD-ROM Titles for Early Childhood

Title	Publisher
A Long Hard Day on the Ranch	Discis
A Trip to the Zoo	Marblesoft
Amanda Stories	Voyager
Arthur's Birthday	Brøderbund Company
ArtSpace	Macomb Projects
Baba Yaga and the Magic Geese	Davidson & Associates
Baby ROM!	Bryon Preiss
Bears at Work	Palladium Interactive, Inc.
Blocks in Motion - Jumbo Blocks	DJD
Chicka Chicka Boom Boom	Davidson/Simon & Schuster
Circus!	Voyager & Matra Hachette
CyberBoogie with Sharon, Lois & Brain	Times Mirror Multimedia Corp 1994
Dr. Suess's ABC	Living Books
Four Footed Friends	VroomBooks
Frog Hollow	Alpha
Green Eggs and Ham	Living Books
Harry and the Haunted House	Living Books
Heather Hits her First Home Run	Discis
Hello Kitty Big Fun Deluxe	Big Top Productions
How Many Bugs in a Box	Simon & Schuster
How Many Bugs in a Box? Two	Simon & Schuster
HyperStudio	Roger Wagner Publishing, Inc.
Imagination Express - Neighborhood	Edmark
Imo & the King	Davidson & Associates
Just Grandma and Me	Brøderbund's/Living Books
Just Me and My Dad	GT Interactive
KC & Clyde in Fly Ball	Don Johnston Incorporated
Kid's Studio	Cyber Puppy
Kids on Site	Digital Pictues, Inc.
Little Monster at School	Brøderbund Company
McGee School Days	Lawrence Productions
Moving Gives Me A Stomach Ache	Discis
Mr. Potato Head -Saves Veggie Valley	Playsckool
Mud Puddles	Discis
Peter and the Wolf - Audio	Time Warner
Peter and the Wolf	Time Warner
Pippi	ahead media AB
Print Shop Deluxe	Brøderbund
Ruff's Bone	Living Books
Sammy's Science House	Edmark
Scary Poems	Discis
Sheila Rae, the Brave	Living Books
Sleeping Cub's Test of Courage/Magic Tales	Davidson
Stanley's Sticker Stories	Edmark
Storybook Maker	Conte'r Software
The Day The Sounds Disappeared!	Ednovation
The Little Samurai	Davidson & Associates
The Tale of Benjamin Bunny	Discis
The Tale of Peter Rabbit	Discis
The Ugly Duckling	Morgan Interactive, Inc.
The Wanderoos Go Exploring	Optical Data Corporation
Thinkin' Things 2	Edmark
Trudy's Time & Place House	Edmark
Workshop	Jokus

RESOURCES for SOFTWARE

CD-ROM Warehouse
1720 Oak Street
Lakewood, NJ 08701
800/237-6623

Don Johnston Incorporated
1000 North Rand Road, Bldg. 115
P.O. Box 639
Wauconda, IL 60084-0639
800/999-4660 or 708/526-2682
Fax 708/526-4177

Educational Resources
1550 Executive Drive
Elgin, IL 60123
USA/Canada 800/624-2926
Illinois 708/888-8499

Macomb Projects
Western Illinois University
27 Horrabin Hall, 1 University Circle
Macomb, IL 61455
309/298-1634

MacConnection
14 Mill Street
Marlow, NH 03456
800/800-2222

Mac Warehouse
47 Water Street
Norwalk, CT 06854-9958
800/622-6222
Fax 203/855-1386

Quality Computers
20200 E. Nine-Mile Road
St. Clair Shores, MI 48080
800/722-3642

Queue, Inc.
338 Commerce Drive
Fairfield, CT 06430
800/232-2224
Connecticut 203/335-0906
Fax 203/336-2482

Tiger Software
P.O. Box 143376
Coral Gables, FL 331145-3376
Macintosh 800/666-2562
DOS 800/888-4437

ZTEK Company
P.O. Box 1055
Louisville, KY 40201-1055
Fax 502/584-9090

Computer Terminology

Adaptive Firmware Card: The Adaptive Firmware Card is a multipurpose peripheral card which allows for modification of the method of input and rate of presentation for many commercial software packages. A primary function of the Adaptive Firmware Card is to enable individuals for whom the computer's keyboard is inappropriate to use commercial software with a single switch. In addition, it allows for other methods of input including scanning, Morse code, and adaptive keys.

Adaptive Keyboard: Adaptive keyboards are generally attached to the computer with firmware cards. These keyboards are usually programmable and enable the user to send information to the computer in different forms. For instance, one key can be the equivalent of an entire word or phrase, or it could be representative of a functional command.

Apple Desktop Bus: Input circuitry built into most Apple computers. The ADB ports are marked with an ADB icon. The ADB port connects to the keyboard, mouse, and other devices, such as graphics tablets, Ke:nx, and bar-code readers to the computer.

Backup: A backup is a copy made of a disk/program, kept on hand to avoid the loss of or damage to crucial data. It is highly recommended that backups be made for heavily used or favorite programs while the originals are kept on file.

Boot: The process of turning the computer on and loading a program into the computer's memory is known as a "boot". Reference is sometimes made to "cold or warm boots". A cold boot is performed when a program is loaded by turning on the computer. A warm boot is done by clearing one program from memory and loading another without turning the computer off.

Bug: An error in a computer program which keeps the program from running correctly.

Byte: A series of eight bits that represents a character, instruction, letter, or number to the computer as a unit of measure for computer memory.

CD-ROM: Information is permanently burned into a disk using laser beams. A mold is made from a master disk and plastic copies are duplicated from the mold. The disks, about 4 3/4" in diameter, are read by a laser beam in a CD-ROM drive that is attached to the computer. You cannot record information such as word processing files to your CD-ROM. (Although erasable optical disks are now being developed.) Because you cannot erase information on a CD-ROM disk, it is ideal for storing databases and other large amounts of information.

CPU: The Central Processing Unit is the main brain of the computer. It is the unit in the computer that processes data, stores data, and retrieves data from memory. When the CPU consists of only one chip, it is called a microprocessor.

Character: A character refers to any letter, punctuation mark, space or digit used to represent information.

Chip: A chip is an integrated circuit containing microscopic switches etched in a small piece of silicon. These chips carry out the processing of data. A chip may hold data permanently or temporarily. They often look like thin, black rectangular boxes with spike-like connectors coming out of the bottom. They either plug into or are soldered into the circuit boards of the computer.

Click: To position the pointer on an object on the screen, the press and quickly release the mouse button.

Clipboard: The holding place for what you last cut or copied; a buffer area in the computer's memory.

Computer Assisted Instruction (CAI): CAI refers to instruction which is conducted or augmented by a computer. CAI software includes drill and practice, tutorials, simulations, problem solving, and educational games.

Computer Managed Instruction (CMI): CMI is intended to make instruction management and record-keeping easier and more efficient. These are teacher-oriented rather than student-oriented programs. For example, the computer might keep records, test results, and progress reports; the computer might generate materials (IEP's) or test students and prescribe appropriate work.

Crash: A crash occurs when a program quits working as it should or the disk is damaged. Most often a crash is permanent damage to the data on a disk, but in some instances it can be a temporary problem due to static, incorrect disk drive speed, or an unknown problem.

Cursor: A cursor is a small, often blinking, symbol which appears on the monitor. It indicates that the computer is waiting to receive information.

Debugging: Debugging is the process of looking for and removing the bugs generated by an Aldus application errors from a computer program.

Disk: A disk (also known as a diskette or floppy disk) is a piece of magnetic storage material similar to recording tape. It is enclosed in protective covering and is used to store computer programs or data. A 5.25" disk has the storage capacity of 143K (or about 70 pages of text). A 3.5" double density disk has the storage capacity of 800K (or about 400 pages of text). A 3.5" high density disk has 1.6 MB.

Disk Drive: A drive is a mechanical device that stores information on and retrieves information from a disk.

Disk Operating System (DOS): This is the program that informs the computer how to use a disk. It tells the computer how to distribute information on the disk and how to read information from the disk.

Documentation: Documentation refers to the instructions or manual which accompanies commercial software programs.

Expanded Memory: Expanded memory refers to added memory, which gives more RAM storage to the computer. (See **Memory, RAM, ROM**)

Firmware: Firmware contains instructions in ROM to operate peripheral devices (e.g. speech synthesizers). Sometimes considered "hard software," these chips can be found on firmware cards placed in the expansion slots of the logic board.

Gigabyte: A unit of measure for computer memory. One GB equals 1000 MB.

Graphics or Touch Tablets: These input devices transfer an image created on a touch sensitive workspace to the computer monitor. A software program and stylus accompany this flat, tracing pad type peripheral. Some instructional software is also available and requires the user to press an area on the pad to operate the program. The area is usually defined with an overlay which is placed over the activation area of the touch tablet.

Hard Copy: A printed copy of the computer program or text.

Hard Disk Drive: A hardware device installed inside or outside of a computer which can store very large amounts of information.

Hardware: Hardware refers to the electronic and mechanical components which make up the computer system. These usually include the computer, monitor, disk drive, and printer.

Hypercard: This complete visual information center allows you to customize, organize, retrieve and deliver information. Like a Rolodex card system, one single card contains a set of specific information. Using hypercard you can combine them together to create stacks. These stacks can contain text, sounds, and graphics.

Hypermedia: Software developed by an author or publisher using hypercard functions that gives you ready made hypercard applications versus making your own (e.g. *Hyper Studio*).

Icon: A graphic symbol on the back panel of the computer or its connecting cables which shows you where to plug in a device. OR - In mouse-based applications, a graphic symbol on the screen that represents a disk, a document, or something else you can select.

Initialize: When a disk is initialized or formatted, it is prepared to receive data. This process electronically divides the disk into sectors and tracks which the computer uses for areas of data storage. Caution should be used when initializing a disk since the disk being initialized will be erased.

Input Device: An input device is a component or peripheral which allows the user to enter information into the computer. The most common input device is the keyboard. Alternative input devices include peripherals such as switches, touch tablets, joysticks, paddles and adaptive keyboards.

Joystick: Commonly used for games, this input device has a control stick and two buttons. Rotating the stick moves the cursor (or action figure) in a 360 degree circle. The buttons can be used to control other features of the program.

K: In reference to computers, K stands for kilo or 1000 (actually 1024) units of memory/storage. These units are counted in bytes; therefore, a computer of 64K has the storage area for 64 kilobytes of data.

Language: A programming language is a set of commands which can be used to instruct the computer to perform specific tasks. Three of the most popular languages used in education are BASIC, Pascal, and LOGO.

Logic Board: This is the main circuit board in a computer and is sometimes called the mother board. It contains the central processing unit (CPU), RAM, ROM, and other specialized chips and circuitry.

Medium or Media: Any material which can store data and/or programs can be called a medium. Examples include disks, punched cards, and cassettes.

Megabyte: A unit of measure for computer memory. One MB equals 1,048,576 bytes or characters.

Memory: Chips in the computer which have the capacity to store information. See RAM and ROM.

Modem: A modem is a peripheral device which allows a computer to transmit and receive data from another computer over the telephone lines. The word modem is derived from the words MOdulate/DEModulate.

Mouse: A computer device that controls the pointer on the screen. You roll the mouse around on a flat surface next to the computer and when you move the mouse, the pointer moves correspondingly.

Output Device: This refers to peripherals which function by sending information out of the computer for use. Output devices include monitors, printers, speech synthesizers, and robots.

Paddles: Paddles are input devices which operate by turning one or both dials or pressing the buttons. Often used for games, one dial moves the cursor (or action figure) horizontally and the other vertically. Some programs require the user to control the action using only the buttons.

Peripheral: A hardware device which is outside of, but connected to, the computer is called a peripheral. These include input and output devices such as joysticks, paddles, graphics or touch tablets, adaptive keyboards, printers, speech synthesizers and robots.

Printers: An output device for printing data onto paper. There are several types of printers. A dot-matrix printer is an impact printer which prints characters and graphics composed of dots. A daisy wheel printer is a letter quality, impact printer which prints pre-formed characters that are located on a printwheel or ball. A laser is a nonimpact printer which uses a laser to make high-quality impressions.

Program: A program is a set of instructions, written in a language the computer understands, which allows the computer to perform a function or task.

Public Domain Software: Software that is not copyrighted.

RAM: Random Access Memory is a temporary storage area for programs and data. This information can be easily altered or deleted. When the computer is turned off, this information is erased. Therefore, data of this sort is stored on disk or cassette and retrieved when needed.

ROM: Read Only Memory is stored permanently and remains available for the computer to use. It may not be altered or erased. It usually includes operational instructions for the computer such as the program to boot the computer and a computer language such as BASIC. This information is not lost when the computer is turned off.

Shareware: Public domain software you can try out. If you like it and decide to use it, you send a donation or stipulated fee (usually small) to an address indicated in the program.

Software: The programs used by the computer. Programs on disks are redoccomm generated by an Aldus applicationferred to as software.

Speech Synthesis: Speech synthesis is an output device which enables the computer to "speak". Specific programs are required for its use.

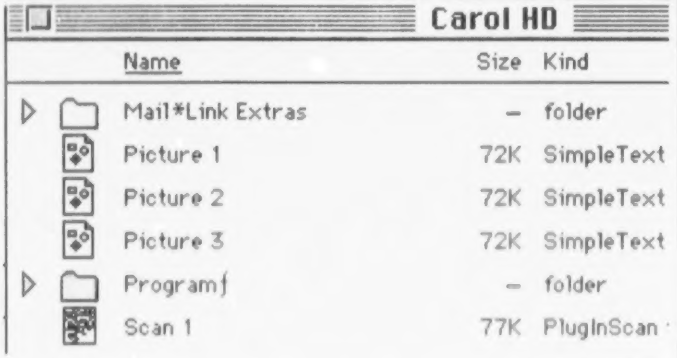
Word Processing: Writing, editing, formatting, and printing of text and documents on a computer system. These programs allow for easy insertion, deletion, and movement of text which permits full revision and print out in a short time.

Write-Enable: There is a small, square cutout in the upper-right corner of a 5.25" disk. If the notch is covered, you can't change the information on the disk, but if the notch is uncovered, the information can be changed. On a 3.5" disk, when the small piece of plastic covers the square hole in the upper-right corner, the disk is write-enabled.

Write-Protect: To prevent changes to the contents of a disk by covering the notch on the side of a 5.25" disk or by sliding the small plastic tab to uncover the square hole on a 3.5" disk.

Capturing and Printing Images From Your Computer

You can capture any image on the screen of a Macintosh with System 7.1 or higher, by simply pressing **Command-Shift 3.** You will actually hear a "click" similar to the sound a camera makes when it takes a picture. The image captured is saved as a "Picture" onto the desktop. Each graphics file is named in consecutive order as "Picture 1", "Picture 2," and so on. The number of graphics you can capture depends on the memory availability of your computer. The graphic can then be opened in a program that handles graphics such as *ClarisWorks* (Claris Corporation).



Carol HD

Name	Size	Kind
Mail*Link Extras	–	folder
Picture 1	72K	SimpleText
Picture 2	72K	SimpleText
Picture 3	72K	SimpleText
Programƒ	–	folder
Scan 1	77K	PlugInScan

Open *ClarisWorks*. Select Painting.

1. Under File, select Insert. Select the desktop of the computer. Find "Picture1." Double click on "Picture 1." The picture will be placed in your document.
2. Make any desired changes to the picture. Save it to disk (preferably high density).
3. Print pictures. Close document.
4. Remove and trash "Pictures" from the hard drive. Since your graphic is saved to disk, you can safely trash it and free-up valuable space on your hard drive. See *Storytime with Bobby and Friends,* page 112, for more curriculum ideas.

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Building InterACTTive Futures

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